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ABSTRACT

Examined were (1) the long-term effectiveness of Head Start; and (2) the success of the Montgomery County (Maryland) Public Schools (MCPS) in educating children from low-income families. The first focus of the study compared the performance of Head Start graduates in elementary and secondary schools to that of students who had applied for Head Start but did not attend. The second compared the performance of Head Start graduates with that of other MCPS students. Findings indicated that participation in Head Start had long-term, statistically significant, positive effects for the Head Start students from 1970-71, but most differences were not statistically significant for students participating in 1974-75 and 1978-79. Factors which predicted outcomes in high school for Head Start graduates included mother's education, family income, sex, ethnicity, and achievement in Grades 3 and 5 as measured by performance on standardized tests. Those in the Head Start sample still experienced a large number of problems as they proceeded through elementary and secondary school. Data suggest that the situation for Head Start participants has not substantially improved over time. Family income level appeared to be at least partly responsible for some of the performance differences between racial/ethnic groups in MCPS. Several groups of students, which included males in general, and Black and Hispanic males and Black females in particular, experienced a disproportionate number of problems. Related materials are appended. (RH)

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MONTGOMERY COUNTY
PUBLIC SCHOOLS
ROCKVILLE, MARYLAND

An Analysis of the Effectiveness of Head Start and of the Performance of a Low-income Population in MCPS

March 1985

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MONTGOMERY COUNTY PUBLIC SCHOOLS
Rockville, Maryland

AN ANALYSIS OF THE EFFECTIVENESS OF HEAD START AND OF THE PERFORMANCE OF A LOW-INCOME POPULATION IN MCPS

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EXECUTIVE SUMMARY

AN ANALYSIS OF THE EFFECTIVENESS OF HEAD START AND OF THE PERFORMANCE OF A LOW-INCOME POPULATION IN MCPS

STUDY DESCRIPTION

Head Start is a federal program for preschool children from low-income families. As stated in the Program Performance Standards (1975):

> The overall goal of the Head Start program is to bring about a greater degree of social competence in children of low-income families. By social competence is meant the child's everyday effectiveness in dealing with both present environment and later responsibilities in school and life. Social competence takes into account the interrelatedness of cognitive and intellectual development, physical and mental health, nutritional needs, and other factors that enable a developmental approach to helping children achieve social competence (p. 1).

The Head Start program in Montgomery County is administered by the school system (in contrast to many other localities where it is administered by a social services agency). Although a federal program in the sense that it receives federal dollars and is under the auspices of a federal office, the program in Montgomery County is primarily funded by local monies. For the school year 1984-85, the local contribution to Head Start was a little over two million dollars, which was 70 percent of the program's budget.

The present study consisted of two parts. The first part examined the long-term effectiveness of Head Start by comparing the performance of Head Start graduates in elementary and secondary schools to that of students who had applied for Head Start but did not attend. The second part of the study examined how successful the Montgomery County Public Schools (MCPS) have been in educating children from low-income families by contrasting the performance of Head Start graduates with that of other MCPS students.

Part 1 of the study examined the long-term impacts of participating in the Head Start program by examining the relative performance of Head Start graduates and the comparison group on a variety of different indicators of academic performance. Also, this part of the study looked at predictors of outcomes in elementary and secondary school to help elucidate the relationship between background factors, early achievement, and later achievement for the Head Start students. Part 1 of the study addressed the following questions:

1. Does participation in Head Start have any long-term effects?

2. What predicts outcomes for high school students who have graduated from the MCPS Head Start Program?

Originally, these two questions were the only two major issues the study was designed to address. However, while the study was in progress, the

superintendent of schools and the Board of Education adopted several priorities on improving student achievement. The new priorities pointed to another question which should be addressed in a follow-up study of this type, and that was the question of just how well have the Head Start students done after leaving the program. The Head Start students provided a unique opportunity to examine how low-income students, a population which in many other school systems experience academic problems, perform in the Montgomery County Public Schools. The data also presented an opportunity to examine the relationship between race/ethnicity and achievement in a low-income population in comparison to the rest of MCPS. The subsequent performance of the Head Start graduates, of course, cannot be interpreted as solely due to their participation in Head Start; by the time the follow-up information on some of the students was collected, they had been in MCPS for 14 years. The following questions were raised in Part 2 of the study:

1. How do low-income students (the Head Start sample) compare to other students in MCPS with regard to academic achievement?

2. Are there differences in outcomes for these students when the data are analyzed by racial/ethnic group membership or sex, and how do these differences compare to those for the other students in MCPS?

Follow-up information was collected on three cohorts of Head Start graduates. The three groups and their respective grade levels for 1983-84 were the following:

Attended Head Start in:	1983-84 Grade Level:
1970-71	12
1974-75	8
1978-79	4

Information was collected on a number of different measures of success or failure in school, such as retention in grade, placement in special education, performance on standardized achievement tests, grade point average, and type of courses taken in high school. There were several sources for the data used in the study. For all three groups of Head Start graduates and their respective comparison groups, demographic information such as mother's education and family income was coded from the cards completed at the time the family applied for admittance to the Head Start program. The second source of information on the students was the computerized pupil data base. The data base contains numerous types of information about students presently and recently enrolled in MCPS including grade level and special education services for the last four years. Test data on the students were obtained from computer tapes containing the results for all MCPS students for any given year of the testing program. For the Head Start class of 1970-71, an extensive review was conducted of student records.

The "other MCPS students" included in Part 2 of the study were all MCPS students, excluding the Head Start graduates, who were born in the same year as the Head Start cohort.

PART 1 - THE EFFECTIVENESS OF HEAD START

SUMMARY OF FINDINGS

The findings for each study question are discussed briefly on the following pages. Part 1 of the study found:

- Participation in Head Start had long-term, statistically significant, positive effects for the Head Start students from 1970-71. The results for the students who attended in 1974-75 and 1978-79 suggested the possibility of an effect for Head Start, but few of the differences were statistically significant.

- Factors which predicted outcomes in high school for Head Start graduates included mother's education, family income, sex, ethnicity, and achievement in Grades 3 and 5 as measured by performance on standardized tests.

FINDINGS

Long-Term Effects of Head Start Participation

Finding: Participation in Head Start had long-term, statistically significant, positive effects for the Head Start students from 1970-71. The results for the students who attended in 1974-75 and 1978-79 suggested the possibility of an effect for Head Start, but few of the differences were statistically significant.

Table E-1 summarizes the findings on many of the measures for the 1970-71 Head Start graduates. The overall pattern of the findings indicated that the students who had attended Head Start in 1970-71 did much better than the comparison group who had not attended. Statistically significant differences were found for the Head Start class of 1970-71 on the following measures:*

- Grade 3 Iowa Test of Basic Skills
- Grade 5 Cognitive Abilities Test
- Grade 5 Iowa Test of Basic Skills
- Grade 7 Cognitive Abilities Test
- Grade 11 California Achievement Tests
- Percentage of students retained by Grade 10 (34% Head Start vs. 55% comparison group)
- Percentage of students in honors courses in Grade 11
- Average percentage of courses with A's and B's in 1981-82 (28% for Head Start vs. 17% for the comparison group)
- Average percentage of courses with low grades in 1981-82 (42% for Head Start vs. 57% for the comparison group)

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*All data were adjusted for demographic differences between the two groups.

TABLE E-1

Numerical and Statistically Significant Differences for 1970-71 Head Start Students

Measure	Num. Diff.[a]	Stat Signif.[b]	Measure	Num. Diff.[a]	Stat Signif.[b]
Achievement Test			Attendance		
			Grade 4	S	N
Average Total Score			Grade 7	S	N
Grade 3	H	N	Grade 10	H	N
Grade 5	H	N			
Grade 7/8	H	N	Special Help		
Grade 11	H	Y	Grade 10	H	N
% High Scorers			Course Selection		
Grade 3	H	Y			
Grade 5	H	Y	Advanced Courses		
Grade 7/8	H	Y	Grade 10	S	N
Grade 11	H	N	Grade 11	H	Y
% Low Scorers					
Grade 3	H	N	Remedial Courses		
Grade 5	H	N	Grade 10	H	N
Grade 7/8	H	N	Grade 11	H	Y
Grade 11	H	Y			
			Grades		
Retention			A & B's		
By Grade 4	H	N	1980-81	H	N
By Grade 8	H	N	1981-82	H	Y
By Grade 11	H	N			
			Low Grades		
Special Education			1980-81	H	N
Grade 4	C	N	1981-82	H	Y
Grade 8	C	N			
Grade 11	C	N	GPA	H	N
Composite Measure			Questionable		
Grade 12	H	Y	Withdrawals	H	N
			Rank		
			Average	H	N
			% above "Average"	H	Y

[a]Numerical difference favored: H = Head Start Group
C = Comparison Group
S = Same, i.e., difference did not exceed two points on a hundred point scale

[b]Difference between the Head Start and comparison group was statistically significant: Y = Yes N = No

- Percentage of students with an overall ranking of average or above (30% Head Start vs. 19% comparison group)
- Composite measure, i.e., retained by Grade 12, in high level special education between Grades 8 and 12, or scored below the 40th percentile on the Grade 11 California Achievement Tests (67% Head Start vs. 99% comparison group)

The findings from the fourth and eighth graders (the Head Start classes of 1974-75 and 1978-79, respectively) hinted at the possibility of a positive effect for Head Start, but the evidence was weak. The only statistically significant difference for the 1974-75 group was the percentage of students below the 40th percentile on the fifth grade California Achievement Tests (33% Head Start to 48% comparison group). For the 1978-79 group, the only statistically significant difference was the percentage of students above the 80th percentile on the Verbal subtest of the Grade 3 Cognitive Abilities Test. This Head Start group also had a larger percentage of high scorers on the other two subtests and the total score on the California Achievement Tests and a higher mean score on all subtests of both tests, but these differences were not statistically significant. For all three years of Head Start graduates, there were a number of measures which favored the Head Start group; but the differences were not statistically significant. There was not a single measure for any of the three Head Start cohorts with a statistically significant difference which favored the comparison group.

An examination of the demographic data for the Head Start and comparison students showed there were important differences between these two groups; for example, the comparison families had higher incomes and higher levels of education. The two groups being compared, therefore, were not truly equivalent. Given the direction of the demographic differences, one would expect the comparison students to do better over the long term. Because of this, analysis of covariance was used to control statistically for the demographic differences in an attempt to make the two groups more equivalent. The capability of this statistical technique to correct for pre-existing differences in this kind of a study is unknown. To the extent that the analysis did not correct for all the differences, the design of the study was biased <u>against</u> finding an effect for Head Start participation. The fact that a difference was found which favored the 1970-71 Head Start group given the less than ideal comparison group speaks to the strength of the effect of Head Start participation. The failure to find an effect for Head Start participation with the other two cohorts could be due to the inability of the design to detect smaller effects rather than the true absence of an effect.

The study was also limited in that it looked only at the effect of Head Start participation as reflected in a student's school performance. Head Start is a multifaceted program, and the impacts on other program areas, such as social competence, health, nutrition, and the family, were not measured directly. To the extent that these are not reflected in a student's later school performance, they were not measured by the study.

Factors Related to Later Performance

Finding: **Factors which predicted outcomes in high school for Head Start graduates included mother's education, family income, sex, ethnicity, and achievement in Grades 3 and 5 as measured by performance on standardized tests.**

Analyses were performed to examine the relationship between outcomes in secondary school and possible predictors for Head Start graduates of 1970-71. The analyses looked at background characteristics such as mother's education and family income, child characteristics such as sex and race/ethnicity, attendance, and achievement as measured by the standardized tests. The relationships between background factors and outcomes were strongest for mother's education and income. Within the Head Start population, the students whose mothers had the higher levels of education and whose families had the higher income levels at the time of application to Head Start tended to have better performance in secondary school. Ethnicity and sex were also predictive. Test performance at Grades 3 and 5 were often among the strongest of any of the predictors. In fact, test performance at these grades was nearly as good at predicting later outcomes as scores on tests taken at a much later time point.

From the standpoint of explaining racial/ethnic differences in performance among Head Start students, the type of data available (i.e., family income data) provided an opportunity to examine statistically how much of the difference between the black and white students was a reflection of income differences. Regression analyses showed that there were some outcome measures where the apparent racial/ethnic differences were totally due to differences in family income. There were other measures where, even with income controlled, there were differences with regard to racial/ethnic group membership which could not be explained. The relationship between family income, racial/ethnicity group membership, and student performance is a complex issue which can only be adequately studied with a sample representing a broader range of income levels than those found among Head Start families.

IMPLICATIONS

The design of the MCPS follow-up study of Head Start graduates was modeled after several recent studies of the long-term effects of early education for children from low-income families, and the MCPS findings are consistent with the findings from this research (Consortium for Longitudinal Studies, 1983; Berreuta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). In the past, studies in this area had followed children only through third grade. These studies generally found a positive effect shortly after program participation, but by Grade 3 there were no longer any differences between children who had participated in a program and those who had not (Horowitz and Paden, 1973). The newer studies followed the children well beyond Grade 3 and looked at more global indicators of school performance, such as retention and placement in special education, in addition to traditional measures such as test performance. The more recent work in the area has concluded that early childhood education does have a positive impact on school performance which lasts for many years.

Although the findings from this study were not entirely consistent from cohort to cohort, the pattern of results suggests that participation in the Head Start program has long-term positive effects; and, thus, Head Start represents a way to improve the achievement of children from low-income families in MCPS.

The relationship between family background characteristics and school performance also has been repeatedly shown in other studies (see Deutsch, 1973, for an extended discussion). The power of early achievement to predict later achievement is also a commonplace finding (Bloom, 1964). Both of these findings served as part of the theoretical basis for the initiation of the Head Start Program by the federal government nearly 20 years ago (Zigler and Anderson, 1979). Their implications for educational practice are as important now as they were then. They suggest that some students are going to need more help than others to attain the same level of achievement. They also suggest that the earlier help is delivered, the better the student's chances are for success at a later point.

PART 2 - THE PERFORMANCE OF A LOW-INCOME POPULATION IN MCPS

SUMMARY OF FINDINGS

Part 2 of the study found the following:

- Even with the assistance of Head Start, the Head Start sample still experienced a large number of problems as they proceeded through elementary and secondary school. The data for the Head Start graduates who were fourth graders in 1983-84 resembled that of the twelfth graders, indicating that the situation has not substantially improved for the younger students.

- Differences in family income appear to be at least partly responsible for some of the performance differences between racial/ethnic groups in MCPS. When racial/ethnic differences were examined in a low-income population (the Head Start sample), some differences were found between Head Start majority and minority graduates; but these differences were not as great as those between minority and majority students in the rest of the MCPS population. There were also differences in the family incomes of the minority and majority Head Start graduates which could account for the apparent differences by racial/ethnic group.

- Several groups of students experienced a disproportionate number of problems. Males consistently had more problems than females. A high percentage of black and Hispanic males, in particular, had problems. A large percentage of black females had also experienced academic difficulties.

FINDINGS

Performance of a Low-Income Population in MCPS

Finding: **Even with the assistance of Head Start, the Head Start sample still experienced a large number of problems as they proceeded through elementary and secondary school. The data for the Head Start graduates who were fourth graders in 1983-84 resembled that of the twelfth graders, indicating that the situation has not substantially improved for the younger students.**

The follow-up data on the Head Start students from 1970-71 represents educational outcomes after 14 years in MCPS. Except for a very small number of students who left the school system and came back, these students received their entire education from the Montgomery County Public Schools. Their educational performance provides an indicator of how successful MCPS has been in educating children from low-income families.

On a ranking measure which incorporated a number of indicators of school performance, 40 percent of the Head Start sample from 1970-71 were classified by 1983-84 as having "serious problems," which was the bottom point on the scale. Another 34 percent were classified as "poor" or "low average" students. In comparison to the other students in MCPS born in 1966, proportionately about twice as many of the Head Start sample from 1970-71 had been retained, nearly four times as many had been in a special class or special school during the preceding four years, and nearly five times as many had scored low on the Grade 11 California Achievement Test.

Table E-2 presents the data for several outcome measures for the three years of Head Start graduates. When the data are examined across the three cohorts, it can be seen that students from low-income families performed poorly regardless of grade level. The retention rates for the Head Start graduates born in 1966, 1970, and 1974 were 27, 22, and 26 percent, respectively. The percentages of students who scored below the 40th percentile on their most recent California Achievement Tests were 56, 30, and 34, respectively. If MCPS were now doing a better job with students from low-income families than in the past, one would expect to see a marked trend to lower rates of school difficulty for the younger students. No such trend was present in the data. The absence of such a pattern suggests that the situation for low-income students in MCPS has shown no signs of substantial improvement over the past decade.

Unfortunately, there are no comparable data from other school systems with regard to many of the outcomes for students from low-income families. There is no way of knowing whether the retention or special education percentages found for this group of low-income MCPS students are high, low, or average relative to other school systems. The data indicate a serious problem regardless of the situation in other school systems, but it would be helpful if the numbers could be put in perspective.

The figures for the Head Start sample from 1970-71 and the figures for the Head Start graduates who were in fourth and eighth grade in 1983-84 which were similar provide an indicator of how well students from low-income families are doing in MCPS. The conclusion is that, as a group, these students are not doing very well.

TABLE E-2

Outcomes for Students
Born in 1966, 1970, and 1974

	Born in 1966		Born in 1970		Born in 1974	
	Head Start %	Other MCPS %	Head Start %	Other MCPS %	Head Start %	Other MCPS %
Not in age-appropriate grade placement	27 (N=177)	13 (N=5913)	22 (N=388)	12 (N=5584)	26 (N=362)	12 (N=3682)
In Level 4 or more special education	19 (N=218)	5 (N=6168)	17 (N=460)	5 (N=5847)	12 (N=410)	4 (N=3841)
Below grade level or in Level 4 or more special education	41 (N=218)	17 (N=6168)	35 (N=460)	17 (N=5847)	34 (N=410)	15 (N=3841)
Below 40th percentile Total Battery, California Achievement Test[a]	56 (N=124)	12 (N=4885)	30 (N=293)	8 (N=4547)	34 (N=272)	10 (N=3199)
Below grade level or in Level 4 or more special education or below 40th percentile	74 (N=205)	27 (N=5869)	54 (N=437)	24 (N=5474)	55 (N=399)	23 (N=3723)

Note: Only students enrolled continuously for the last four years are included. Percentages were computed only on students who did not have missing data for a category, i.e., the number in parentheses below the percentage.

a. Born in 1966 - Administered in Grade 11
Born in 1970 - Administered in Grade 8
Born in 1974 - Administered in Grade 3

Differences by Racial/Ethnic Group

Findings: **Differences in family income appear to be at least partly responsible for some of the performance differences between racial/ethnic groups in MCPS. When racial/ethnic differences were examined in a low-income population (the Head Start sample), some differences were found between Head Start majority and minority students; but these differences were not as great as those between minority and majority students in the rest of the MCPS population. There were also differences in the family incomes of the black and white Head Start students which could account for the apparent differences by racial/ethnic group.**

- **Several groups of students experienced a disproportionate number of problems. Males consistently had more problems than females. A high percentage of black and Hispanic males, in particular, had problems. A large percentage of black females had also experienced academic difficulties.**

As discussed above, examining outcomes for the Head Start samples provided a unique opportunity to learn how students from low-income families with different racial and ethnic backgrounds fare in the Montgomery County Public Schools. The racial differences among the Head Start samples in comparison to those for the rest of MCPS could also provide insight as to whether or not differences in family income could partially account for the differences so often seen in MCPS student data. An absence of minority/majority differences in a low-income population would raise the possibility that the differences often found within MCPS may be a function of family income. The sex differences were also compared for the Head Start and MCPS groups. For these analyses, the Head Start sample's performance was contrasted with that of all other MCPS students born in the same year.

The picture with regard to income and race in these data was not as clear-cut as one would hope. An analysis of family income for the Head Start families showed that the black families had a statistically significant lower family income than the white families for each of the three Head Start cohorts. This means that any outcome differences between the blacks and whites <u>within</u> the Head Start samples are difficult to interpret because of the income differences.*

The findings from the analysis of differences showed that the differences between the minority and majority students were less for the Head Start sample than for the non-Head Start students in MCPS. There were few differences between the white, Asian, and Hispanic Head Start graduates, and those between the white and the black students were much less than those

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*As presented in the summary of the finding of Part 1, a regression analysis of the data for the Head Start population showed that some of the differences were due primarily to income; while on other measures, even with income controlled, there was an unexplained difference between black and white students. This same kind of more sophisticated analysis could not be undertaken with the data for the other MCPS students because family income data are not available.

between their counterparts in the rest of MCPS. For example, for the students born in 1966 (Grade 12 in 1983-84), the ratio of blacks to whites with low scores on the Grade 11 California Achievement Tests was about two to one for the Head Start sample. The same ratio for the other MCPS students was over three to one; i.e., there were proportionately three times as many blacks with low scores as there were whites with low scores.

The analysis of differences also pinpointed three groups who have been experiencing a disproportionate number of school difficulties: black males, black females, and Hispanic males. This finding appears to hold for the Head Start sample as well as the other MCPS students although only one of the three Head Start groups had a sufficient number of Hispanic males upon which to base any conclusions. The finding was very strong for the other MCPS students and held for all three years examined. Students from these three groups, regardless of whether or not they attend Head Start, are at a much higher risk for failure than are Asians, white males and females, and Hispanic females.

While the data for all of the Head Start graduates are of concern with regard to later performance, the findings for the black students are particularly so. For the blacks who attended Head Start in 1970-71, 29 percent of those still enrolled had been retained by 1983-84; 21 percent had been in a Level 4 or more special education class in the last four years; and 69 percent had scored below the 40th percentile on the eleventh grade administration of the California Achievement Tests. Eighty-two percent had had one of these three problems; or looking at the reverse, only 18 percent of the black Head Start graduates had not been retained, not been in special education recently, and had scored at or above the 40th percentile on the California Achievement Tests.

IMPLICATIONS

Compared to the rest of the MCPS population, students in the Head Start sample experienced a disproportionate number of academic problems. This was true despite the fact that Head Start helped them perform better than they would have done without it. Unfortunately, the data from the study cannot explain why this situation occurred. Several hypotheses are possible:

- One hypothesis is that the children leave Head Start having made substantial gains in a number of developmental areas. They enter kindergarten with a higher skill level* than children from

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*The phrase "skill level" is used to describe the entire set of behaviors, attitudes, abilities, prior knowledge, etc., that enable a child to function successfully in the classroom. It encompasses the personal-social as well as the cognitive requirements.

comparable families who did not attend Head Start.* Their status relative to other children from more socioeconomically advantaged families who make up a substantial proportion of the MCPS population is unknown. If the Head Start graduate enters kindergarten with less well-developed skills than "the typical Montgomery County kindergartener," if the class is made up of many children from more socioeconomically advantaged families, and if the teacher's perception of a child's classroom performance and behavior is influenced by the relative skill level of the class, then the Head Start graduate enters kindergarten at a disadvantage. Regardless of the fact that the Head Start graduates are performing better than they would have without Head Start, their skill levels may still be below that of their classmates. The distance between them may stay the same or get even wider as time goes by.

- Another possibility is that the Head Start graduates arrive in kindergarten as ready as the "typical Montgomery County kindergartener." However, as the school year or years go on, a gap begins to emerge between the socioeconomically advantaged and those who are not so advantaged.

Any number of factors have been postulated as contributing to the achievement discrepancy between low-income and higher-income students. This discrepancy has been found in numerous other studies besides this one. Possibilities include teacher behavior, classroom structure, conflict of cultures, insufficient individual attention, and a variety of home factors. In a school system where overall achievement is very high, the curriculum in general and the focus of instruction in particular may be geared at a level which is inappropriate for some students and results in their becoming progressively farther behind. Whatever is responsible for the poor performance of low-income students in other school systems, the problem may be magnified in Montgomery County because the socioeconomic distance between the richest and the poorest families is so great in many instances.

The findings from this study indicate the need to examine carefully the type of education currently provided to low-income students in the Montgomery County Public Schools. This examination needs to focus on instruction in the regular classroom as well as the total package of remedial and special services for low-income students, including programs such as Head Start, Chapter 1, and Quality Integrated Education. Although it was impossible to investigate the type and extent of special services that the Head Start graduates received in elementary and secondary school because of poor

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*Kindergarten performance data were not available to this study; the first individual achievement measure was administered in third grade. Given the data available, we cannot definitely conclude that the Head Start group outperformed other low-income students in kindergarten. However, given the pattern of the evidence as well as the findings of a number of other studies of early childhood programs, it is a reasonable inference.

documentation in the records, it is reasonable to assume that many were the recipients of a number of such services. The poor performance of these low-income students compared to their higher-income peers raises questions about the effectiveness of regular education and the mix of supplemental services when viewed as a total system.

Issues which need to be examined with regard to the regular instruction and/or special services provided to low-income students include the following:

- o Appropriateness
- o Comprehensiveness
- o Coordination
- o Quality
- o Availability
- o Inefficiencies due to overlap
- o Conflicts in regulations and practices

It should also be noted that the discrepancy in academic performance as a function of family background is not a problem unique to the Montgomery County Public Schools. The problem and its solution have challenged educators nationwide (Frechtling, Raber, and Ebert, 1984).

As the superintendent of schools and the Board of Education recognized in the recently adopted priorities, some type of change is needed for some students in MCPS. This study demonstrated that MCPS, like other school systems, has not thus far found a way to prevent a disproportionate rate of academic problems among students from low-income families. While the study's findings reflect history for several groups of Head Start students, they do not necessarily predict the future for the Head Start students of 1984-85. However, given that the findings for the fourth graders and the eighth graders paralleled those for the oldest students with regard student performance, it seems safe to maintain that history certainly can repeat itself. Unless the Head Start class of '85 is provided, as they move through the grades, with a different kind of education than their older brothers and sisters received, there is no reason to believe the outcomes or the relationships between background characteristics and outcomes for these children will be any different.

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CHAPTER 1

BACKGROUND OF THE STUDY

STUDY ISSUES

Head Start is a federal program for preschool children from low-income families. As stated in the Program Performance Standards (1975):

> The overall goal of the Head Start Program is to bring about a greater degree of social competence in children of low-income families. By social competence is meant the child's everyday effectiveness in dealing with both present environment and later responsibilities in school and life. Social competence takes into account the interrelatedness of cognitive and intellectual development, physical and mental health, nutritional needs, and other factors that enable a developmental approach to helping children achieve social competence (p. 1).

The Head Start Program in Montgomery County is administered by the school system (in contrast to many other localities where it is administered by a social services agency). Although a federal program in the sense that it receives federal dollars and is under the auspices of a federal office, the program in Montgomery County is primarily funded by local monies. For the 1984-85 school year, the local contribution to Head Start was a little over two million dollars, which was 70 percent of the program's budget.

The present study consisted of two parts. The first part examined the long-term effectiveness of Head Start by comparing the performance of Head Start graduates in elementary and secondary school to that of students who had applied for Head Start but did not attend. The second part of the study examined how successful the Montgomery County Public Schools have been in educating children from low-income families by contrasting the performance of Head Start graduates with that of other MCPS students.

Part 1 of the study examined the long-term impacts of participating in the Head Start Program by examining the relative performance of Head Start graduates and the comparison group on a variety of different indicators of academic performance. Also, this part of the study looked at predictors of outcomes in elementary and secondary school to help elucidate the relationship between background factors, early achievement, and later achievement for the Head Start students. Part 1 of the study addressed the following questions:

1. Does participating in Head Start have any long-term effects?

2. What predicts outcomes for high school students who have graduated from the MCPS Head Start Program?

Originally, these two questions were the only two major issues the study was designed to address. However, while the study was in progress, the superintendent of schools and the Board of Education adopted several priorities on improving student achievement. The new priorities pointed to another question which should be addressed in a follow-up study of this type and that was the question of just how well the Head Start students have done

after leaving the program. The Head Start students provided a unique opportunity to examine how low-income students, a population which in many other school systems experience academic problems, perform in the Montgomery County Public Schools. The data also presented an opportunity to examine the relationship between race/ethnicity and achievement in a low-income population in comparison to the rest of MCPS. The subsequent performance of the Head Start graduates, of course, cannot be interpreted as solely due to their participation in Head Start; by the time the follow-up information on some of the students was collected, they had been in MCPS for 14 years. The following questions were raised in Part 2 of the study:

1. How do low-income students (the Head Start sample) compare to other students in MCPS with regard to academic achievement?

2. Are there differences in outcomes for these students when the data are analyzed by racial/ethnic group membership or sex and how do these differences compare to those for the other students in MCPS?

The study collected follow-up information on three cohorts of Head Start graduates. The three groups and their respective grade levels for 1983-84 were:

Attended Head Start in:	1983-84 Grade Level:
1970-71	12
1974-75	8
1978-79	4

Most of the findings presented in the body of this report are from the 1970-71 group because they had been in MCPS longer and because a more extensive procedure was used to collect their data. Information was collected on a number of different measures of success or failure in school, such as retention in grade, placement in special education, performance on standardized achievement tests, grade point average, and type of courses taken in high school.

The introductory chapter contains descriptive information about the Head Start Program in general and in MCPS in particular. Numerous research studies have been conducted examining various aspects of Head Start nationwide. The general conclusions of these studies and some of the other important evaluations of similar early childhood programs are summarized to set the stage for the findings of the study.

THE HEAD START PROGRAM

Head Start is a federally funded preschool program targeted for children from low-income families. Head Start was formulated as part of the arsenal in the War on Poverty in the '60s. In analyzing poverty in this country, policy makers saw a cycle: the children of poor parents performed poorly in school which in turn led to poverty and joblessness in each successive generation. The poor academic performance of children from low-income families was particularly distressing, since education in this country had philosophically been considered to present an equal opportunity for success to everyone regardless of background.

At the same time as the nation was turning its attention to the causes of poverty, psychologists were abandoning the notion that intellectual development was fixed by genetics and were proclaiming the importance of the early years for later development. Benjamin Bloom was in the forefront of this movement when he maintained that intellectual growth occurred most rapidly during the first four or five years of life and that the best time to affect intellectual development was during the preschool years (Zigler and Anderson, 1979.)

The combined force of the political climate of the times and the emerging scientific thought on the nature of intelligence resulted in recommendations to establish programs to enrich the early experiences of children from low-income homes. Project Head Start was the federal response to these recommendations.

The program's seven goals as set forth by the Planning Committee in 1965 were:

1. Improving the child's physical health and physical abilities.
2. Helping the emotional and social development of the child by encouraging self-confidence, spontaneity, curiosity, and self-discipline.
3. Improving the child's mental processes and skills, with particular attention to conceptual and verbal skills.
4. Establishing patterns and expectations of success for the child that will create a climate of confidence for future learning efforts.
5. Increasing the child's capacity to relate positively to family members and others, while at the same time strengthening the family's ability to relate positively to the child and his problems.
6. Developing in the child and his family a responsible attitude toward society and encouraging society to work with the poor in solving their problems.
7. Increasing the sense of dignity and self-worth within the child and his family. (Richmond, Stipek, and Zigler, 1979)

It is important to note that only one of the goals was related to improved educational skills. From the beginning, Head Start was concerned with the "whole child," including health, nutrition, social development, and the family.

The first Head Start Program operated for eight weeks in the summer of 1965. The following year, full-year Head Start programs began operation. Since 1965, Head Start has served 8 million children between the ages of 3 and 6. Head Start's initial share of the federal budget was under $100 million. For 1983, it was $912 million. Presently, Head Start serves approximately 395,000 children in 21,000 classrooms across the country. (Education Almanac, 1984)

HEAD START IN MONTGOMERY COUNTY

The MCPS Head Start Program has been operating since the first summer program in 1965. The program has been serving approximately 800 children per year. As described by the "Fact Sheet" put together by the Division of Head Start, the program is

> a full-year program designed to help economically disadvantaged prekindergarten children and their families through health services, parent involvement, education, social services, cultural opportunities, social adjustment, and gainful employment of parents.

Children are enrolled in 53 classes of approximately 16 children. Each classroom has one teacher and an instructional assistant. The classes meet for approximately 3 hours per day. The length of the day and the student:teacher ratio have remained approximately the same since the program began operating as a full-year program in 1966.

NATIONAL EVALUATIONS OF HEAD START[1]

At the federal level, Project Head Start has been the subject of numerous evaluations. The conclusions drawn from those evaluations have undergone three major shifts since 1965 (Datta, 1979). The early evaluations, from 1965 to 1968, were interpreted as showing that participation in a Head Start program had definite immediate and possible long-term benefits. In 1969, the Westinghouse Report was published which was the first national evaluation of Head Start. The results of this evaluation were generally interpreted as showing that Head Start had no lasting effects and achieved only minimal short-term gains. Since 1975, several new studies have been published and they have been interpreted as indicating both immediate and long-term effects of Head Start participation.

Short-term Effects

The first large-scale study to examine the impact of Head Start participation on achievement in elementary school was the well-known Westinghouse/Ohio State evaluation (Cicirelli, 1969). The study concluded that the summer Head Start programs were ineffective in producing any cognitive gains that persisted into elementary schools and that the full-year programs were only slightly effective in producing cognitive gains through third grade. Furthermore, Head Start graduates still performed far below national norms on standardized tests. The Westinghouse study, while widely quoted, was also widely criticized on methodological grounds including the use of a noncomparable comparison group and inappropriate instrumentation for measuring effects.

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1. The information in this section was summarized from A Review of Programs and Strategies Used in Other American School Systems for Improving Student Achievement (Frechtling, J.; Raber, S.; and Ebert, M. Rockville, Md: Montgomery County Public Schools, 1984.) The interested reader is referred to that document for a more thorough treatment of the topic.

In 1969, Head Start Planned Variation was initiated to provide more experimental data on the relative effectiveness of different educational models. The three national evaluations of the project concluded that on measures of academic achievement and cognitive development, the gains for Head Start children exceeded those attributable to maturational development and that Head Start was indeed effective in accelerating the cognitive development of preschool children from low-income families (Hodges and Cooper, 1981; Bissell, 1971; and Weisberg, 1974).

The Head Start Synthesis Project is presently compiling the findings of all Head Start research and evaluation studies between 1965 and 1984. The impact of Head Start is being assessed through the use of a meta-analysis which is a technique for quantitatively summarizing the results of numerous studies. The preliminary findings of this project suggest that Head Start has had a significant impact on the cognitive development of its graduates. Furthermore, the data indicate that Head Start programs have grown more effective over the years (Harrel, 1983). The larger gains seen for children who have attended Head Start since 1970 have been attributed to better programs which have emerged over the years (Collins, 1983).

Long-term Gains

The evidence from the research on Head Start and other early intervention programs, while demonstrating the immediate gains made by program participants, also found that these gains diminished with each successive year and that, by around third grade, there were no longer any differences between program participants and the comparison children (Bronfenbrenner, 1974). One interpretation of this finding was that the schools were not building on the gains the children had made in their preschool years. This led to the creation of programs like the Follow Through programs which were designed to continue intensive instructional intervention through the primary grades. Another interpretation was that evaluations had focused almost exclusively on cognitive gains and these were often measured by IQ tests. The focus of the program and thus the expected impacts were much broader than improved performance on an IQ test. Possibly, Head Start and other early intervention programs were having long-term impacts, but these were being missed because inappropriate measures were being used.

The Consortium for Longitudinal Studies collected follow-up information on the graduates of 12 experimental preschool intervention projects which had operated in the late 1960s and early 70s. Although the researchers included measures of effectiveness that had been examined previously, like IQ, they also looked at program impact in a new way. The studies examined "molar indicators" of effectiveness, such as whether the child had been placed in a special class or had been retained in grade. Measures such as these are more meaningful because they incorporate more of the preschool program's goals and because any positive findings can easily be used to calculate the cost effectiveness of participating in a preschool program. The follow up of the original program participants five to ten years after they finished the program showed that the program graduates were significantly more likely to meet the school's basic requirements. Controlling for family background and initial ability, program graduates were significantly less likely to be placed in special education classes and were less likely to be retained in grade than were children in the control group. They also found that program graduates performed better on achievement tests than did the control

children. They found differences on math and reading tests at Grade 3 and for math tests at Grades 4 and 5 (Lazar et al., 1982).

The most recent follow-up study of the effects of early childhood education for children from low-income families was conducted by the High/Scope Educational Research Foundation (Berrueta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). Participants in the Perry Preschool Project were followed through their late teens and early twenties. The study found differences between the "preschool" and "no preschool" group on a variety of outcome measures including high school graduation rates, receipt of welfare assistance, and arrest rates. The economic analysis of the data indicated that the benefits to society of preschool participation exceeded the costs by a ratio of 7 to 1.

APPROACH OF THIS STUDY TO ANSWERING THE QUESTION OF EFFECTS

Part 1 of this study, like some of the more recent work on other early childhood programs, looked at the long-term effects of participating in a Head Start Program. For the two younger groups of students (fourth and eighth graders), the outcome measures were performance on standardized tests, retention in grade, placement in a special education program, and a composite variable of school success which includes all three. For the older group of students, those in Grade 12 for 1983-84, the study looked at these outcomes along with a number of other indicators of school performance.

Part 1 compared Head Start children with a comparison group of children who had applied but never attended Head Start. There are some methodological problems associated with this type of comparison because the children were not randomly assigned to one group or the other. These problems are discussed in the following chapter.

Numerous evaluations have already documented positive short-term effects of participation in an early childhood program. There was a very high probability that testing children immediately after participation in the MCPS Head Start Program would have replicated this common place finding. The more interesting question is whether the gains last and whether they translate in outcomes that are significant for the child's life (and for the school system) in the long run. Because of this, the study focused on long-term outcomes of substantial social significance such as repeating a grade or being placed in a special education class.

OVERVIEW OF THE REPORT

The methodology of the study is discussed in **Chapter 2.** Topics covered include a discussion of the groups of students in the study, how the information was collected, and how it was analyzed. Those who might be inclined to skip methodology chapters are encouraged to read Chapter 2 because it provides some important background information for the statistical analyses in Chapter 3.

The findings for Part 1, the examination of the effectiveness of Head Start, are presented in Chapters 3 and 4. **Chapter** 3 presents the outcomes for the

Head Start students and the comparison students to answer the question about the effects of participating in Head Start. The data presented in Chapter 3 are primarily from the 1970-71 cohort (the twelfth graders of 1983-84) with only a brief discussion of findings from the other two cohorts. Additional information about the 1974-75 and 1978-79 groups can be found in Appendices D and E.

The data on predictors are presented in **Chapter 4**. Correlations were calculated between preschool information, such as mother's education and family income, and later performance measures, such as test scores at Grades 3 and 11. In a related analysis, all Head Start graduates still enrolled in MCPS in high school were assigned a rating on a seven-point scale based on a number of performance indicators. Background variables were analyzed to determine the relationship with the student's placement on this scale. Conclusions for Part 1 are presented in **Chapter 5**.

Findings for Part 2, which look at the performance of the low-income Head Start sample in comparison to all other MCPS students, are presented in Chapters 6 and 7. Information about the overall performance of the three groups of Head Start graduates in comparison to other MCPS students born in the same year is presented in **Chapter 6**. Performance on standardized tests, retention in grade, and special education placement are examined. **Chapter 7** presents data on the same measures by race/ethnic group and by sex for the Head Start samples and for other MCPS students. Conclusions for Part 2 are presented in **Chapter 8**.

CHAPTER 2

METHODOLOGY

The follow-up study of Head Start graduates was complex in that it assembled information from a variety of sources and utilized some sophisticated statistical techniques to analyze the data. This chapter provides the technical background information to the study. It includes a discussion of how the groups were defined and a lengthy discussion intended for the non-statistical reader of how the data were analyzed. The findings in Chapter 3, where the question of the effect of Head Start participation is addressed, have all been adjusted for demographic differences between the Head Start and comparison groups. A careful reading of Chapter 2 is required to understand the purpose and limitations of this adjustment.

STUDENTS IN THE STUDY

The analyses in Chapter 3 contrast the performance of the Head Start graduates with that of the comparison group. The initial Head Start and comparison group samples for each of the three years (1970-71, 1974-75, and 1978-79) consisted of all children whose families had requested that their child be enrolled in a Head Start classroom. For purposes of the study, "Head Start students" were those children who had attended the program for 8 or 9 months.

The "comparison students" were children who had attended the program for less than one month or who were never admitted to the program. The comparison group included children who were waiting to be admitted to a Head Start classroom that was full, children who were ineligible because their families were over-income, children whose parents lost interest after applying, children whose families moved away after applying, or children whose families later decided they needed a full-day program. For the purposes of evaluating the program, it would be most helpful to know more about the children who made up the comparison group, but only the sketchiest information was available. Children who were not four years old during their Head Start year or who had attended Head Start for more than two but less than seven months were excluded from all analyses.

For all analyses involving the Head Start and comparison students, the actual number of students available for any individual analysis depended on several factors, including the availability of demographic data on the student, whether or not the student was still enrolled in the system, and whether the student had data for the outcome measure in question. For example, did the student take the California Achievement Tests in third grade?

The "other MCPS students" referred to in Chapters 6 and 7 include all MCPS students, excluding the Head Start students as defined above, who were born in the same year as the Head Start students.

ATTRITION

One limitation of any follow-up study is the extent to which students move away and thus are no longer available for follow up. Although it was known that some of the students who had left MCPS moved to neighboring school systems, no attempt was made to collect information on these students because of the amount of resources which would have been required. All data reported in this study refer to performance as an MCPS student. Once a student was out of the system, he or she was out of the analysis (although reason for withdrawal was itself an outcome measure examined in the study).

While the data are longitudinal in that there is year-to-year information on a number of students, what is actually presented in each of the analyses is more of a snapshot of the situation at a particular point in time. For many of the analyses, the group of students changes slightly from year to year, with fewer students being available each subsequent year. Some thought was given to restricting the analysis for the 1970-71 cohort only to those students who had been enrolled in the system continuously between Head Start and Grade 12. In this way, a true longitudinal picture of movement through the system could have been provided. The approach was rejected as seriously misleading because of the sizable percentage of students with serious problems who dropped out in high school. To arbitrarily exclude these students from all analyses would have presented a distorted picture.

Appendix B presents information about the percentage of Head Start and comparison students enrolled at several time points. For the 1970-71 group, enrollment information is presented for every year from kindergarten to Grade 11. For the other two groups, the information was available for the four years between 1980 and 1984. The same pattern emerged from all three cohorts. It appears that the Head Start students are considerably more likely to enroll in MCPS initially; but once the students are enrolled, the rate of departures are very similar.

"Differential attrition" describes a situation where one type of student is no longer available for follow-up in one group and another is no longer available in another. For instance, if most of the comparison students who left MCPS were boys and most of the Head Start students who left were girls, there would be differential attrition on the basis of sex. Additional analyses were done for each cohort to compare the demographics of the students who were still in the system with those who had withdrawn. The results of these analyses are shown in Appendix C. There appeared to be no consistent trend across cohorts as to the types of families who left MCPS and those who stayed. For the 1978-79 year, for both the Head Start and comparison groups, the families of the students who were still enrolled had higher incomes than those who left. This pattern also held for the comparison group for the 1970-71 cohort; however, just the opposite was true for the Head Start group.

It can be argued that from a policy standpoint for MCPS, the students who leave or never enroll are not really a concern. To the extent Head Start offsets the need for future remedial services, the benefits to MCPS are greatest for those students who stay in the system. If one supports that line of reasoning, then the study focused on the students who are of the most concern.

DATA COLLECTION

There were several sources for the data used in the study. For all three cohorts of Head Start graduates, information was coded from the cards completed at the time the family applied for admittance to the Head Start Program. The cards contained primarily demographic information such as:

- Number of people in the household
- Family income
- Mother's education

Not all of the cards were completely filled out which resulted in missing data for some of these variables.

The second source of information on the students was the computerized pupil data base. The data base contains numerous types of information about students presently and recently enrolled in MCPS. Information extracted from the data base provided some of the dependent variables for the study. Information available from data base included present grade level and special education services for the last four years.

Test data on the students were obtained from computer tapes containing the results for all students in the county on any given year of the testing program. The testing tapes and the pupil data base were the only sources of information for the outcome measures for the Head Start and comparison groups of 1974-75 and 1978-79, and for all three groups of "other MCPS students."

For the Head Start class of 1970-71, an extensive review was conducted of student records. The record review allowed the compilation of considerably more data on these students. Information taken from the student's records included the following:

- Attendance
- If retained, when the child was retained
- Honors and remedial courses taken
- Grades
- Special education services for the child's entire school history

Additionally for the 1970-71 students, withdrawal codes were manually extracted from the pupil data base and GPA was coded from centrally maintained records.

ANALYTIC APPROACH TO DETERMINING THE EFFECT OF HEAD START PARTICIPATION

A retrospective longitudinal study to determine the effects of participating in a program a number of years ago raises several methodological problems. Ideally, to determine the effect of participating in Head Start, one would begin with a group of children all of whom were eligible for the program on the basis of family income. Half would be randomly assigned to participate and the other half would not. In this way, one could be reasonably certain that the two groups were equivalent on any number of measures which might later turn out to be related to academic success. Obviously, the process of choosing children for Head Start was not random.

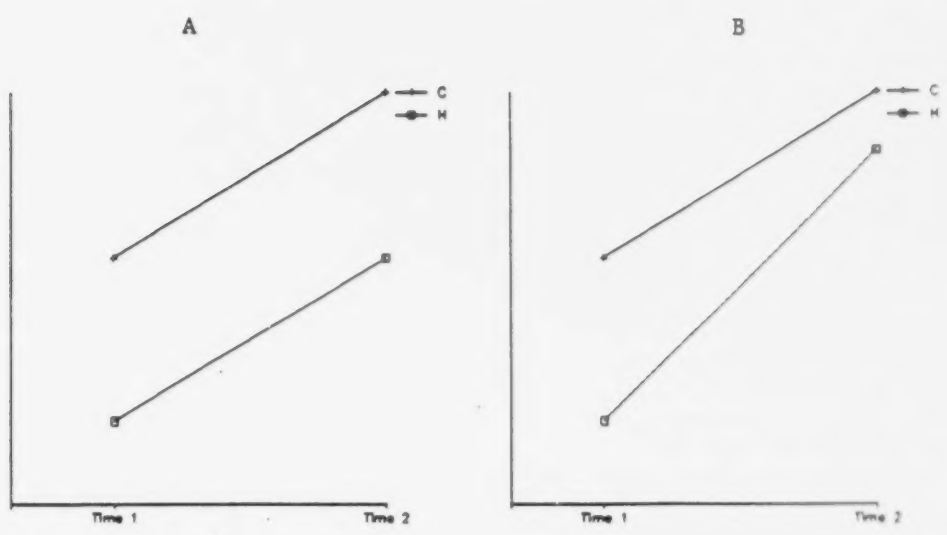
In the absence of random assignment, one needs to assess and account for the extent of differences between the group that received the Head Start program and the group that did not. These differences are important, because if they are related to the outcome measures of interest, the two groups would be expected to differ later regardless of whether or not they had participated in Head Start. For example, suppose that before beginning in Head Start, the Head Start group had a mean score on a hypothetical readiness measure of 50 and the non-Head Start group had a score of 60. Further suppose that performance on this readiness measure was correlated with success in first grade which is a reasonable assumption since performance at Time 1 tends to predict performance at Time 2. To find that the non-Head Start group had higher scores than the Head Start at the end of first grade would show nothing about the effect of Head Start participation since the groups were not equivalent at the beginning.

A statistical technique which can be used to "correct" for this kind of pre-existing differences is analysis of covariance. Analysis of covariance takes into account the initial differences between the groups and determines if, when these differences are accounted for, there are indeed differences between the groups at Time 2. It does this by adjusting the scores on the Time 2 measures to be what they would have been had the two groups been equivalent at Time 1.

Consider the two hypothetical sets of findings shown in Figure 2.1. In both graphs and at both time points, Group C is superior to Group H. However, in the second graph, the groups differ less at Time 2 than they did at Time 1. If the H group was the group that participated in a program and the program occurred between Time 1 and Time 2, then analysis of covariance could be used to detect what appears to be a positive effect for program participation in graph B. The gap between the two groups has been lessened even though Group C is still higher than Group H.

FIGURE 2.1

Hypothetical Comparison



While the graphic representation works well in the abstract, it becomes less useful when the two measures are not the same. If the Time 1 measure is a test score and the Time 2 measure is placement in special education, one cannot sensibly connect them with a line. The analytic question, i.e, does participation in program X reduce the need for special education when one controls for initial skill differences between students, is, however, still valid and and can be addressed through analysis of covariance.

With respect to the Head Start study, it is important to examine and take into account any initial differences between the Head Start and comparison groups. Preprogram differences which were likely to be important insofar as they were likely to be related to the outcome measures which are the focus of the study include differences in intelligence, reading readiness, problem solving, language development, maturity, attention span, and a number of other indicators of functioning in a four year old. Unfortunately, the study did not have available any measure of child performance which was administered prior to beginning Head Start. There is nothing known about the skills and abilities of the two groups at that point in time.

There were, however, other indicators that the Head Start and comparison groups were not equivalent. For all three cohorts, an analysis of demographic information revealed some important differences. The comparison groups had higher family incomes, higher per person income, higher levels of mother's education, and fewer people in the household. For example, for the 1970-71 group, the Head Start children had an average family income of $4685 compared to $6737 for the other children ($p < .01$). There were an average of 6.0 people in the Head Start households compared to 4.5 in the comparison group households. These differences are not surprising given that some of the comparison group children were not able to get into Head Start because they were over the income guideline.

These differences between the groups are critically important for the study because family demographics have been found to be related to cognitive and social skills of preschoolers (Hess, 1970) and to academic and social outcomes through the elementary and secondary years (Berrueta-Clement et al., 1984). It is reasonable to assume that had performance measures of the children as four year olds been available, the comparison group would have had higher mean scores. Because of this and the direct link between demographic factors and school performance, the comparison group would be expected to do better in school. With regard to how the groups compared at Time 1, the situation is much like that depicted with the hypothetical examples in Figure 2.1 above. Because the two groups are not equivalent, analysis of covariance is required to determine whether the data more truly resemble example A or example B in Figure 2.1.

While it would have been desirable to use a measure of child performance in the analysis, in the absence of such a measure, the demographic information was used. The demographic variables used as covariates were:

- Per person income
- Mother's education
- Number of parents living with the child
- Mother's occupation
- Number of people in the household
- Family income

Furthermore, sex and ethnicity were entered into the analysis prior to examining the effect of Head Start participation. This was done because sex and ethnicity were often related to the outcome measures, and the sex by ethnicity makeup of the Head Start and comparison groups was not identical. For instance, if boys were retained more often (which the study showed they were) and the Head Start group had a higher percentage of boys, Head Start participation and sex are confounded. The effect of sex on retention needs to be accounted for before the effect of Head Start can be examined. This confounding could also work the other way. If the Head Start group had more girls, that Head Start group would have proportionately fewer retentions; however, the reason might have absolutely nothing to do with Head Start participation.

The data reported in Chapter 3 to examine the effect of Head Start participation have been adjusted for the demographic, sex, and racial/ethnicity differences between the groups. **The adjusted figures represent the best estimate of where the Head Start and comparison groups would have scored on the outcome measure had they been equivalent at the start.** The actual mathematics of each analysis almost always involved taking points away from the comparison group's score. The analysis "subtracts away" the edge given them by virtue of having demographics more favorable to academic achievement and, thus, allows for a "pure" test of the effects of Head Start. Consider this example from the 1970-71 cohort. On the Composite of the Iowa Test of Basic Skills given in third grade, the unadjusted and adjusted average scores in NCE points were:

	Head Start (N = 169)	Comparison (N = 26)
Unadjusted	33	40
Adjusted	35	30

The change in the comparison group's score was more dramatic because there were so many more Head Start students and they served in a sense as the "anchor" with the comparison students moving with respect to them. The adjusted figures themselves are somewhat meaningless. The real focus in interpreting the data is the direction and extent of the difference between the Head Start and comparison group after the adjustment has been applied. In the example above, the actual data showed a seven-point advantage for the comparison group. The adjusted figures which represent a better test of the effect of Head Start participation show a five-point advantage for Head Start (which was not statistically significant).

There are several limitations to using analysis of covariance in a study of this type. One of the most serious limitations is that the analysis can only correct for differences that have been measured. The fact that the groups differed on demographic indicators probably means they differed on other things as well. One probable difference between the groups has already been mentioned -- skill level of the children prior to Head Start. Other important differences could include such things as number of books in the home or parental aspirations for the child. There is every indication that a number of other background variables were associated with the outcome measures since generally only between 10 and 20 percent of the variance in the data was accounted for by the factors examined. The impact of not being able to statistically correct for these differences was in all likelihood to

bias the study **against finding an effect for Head Start.** The statistical adjustment **underadjusts** to some unknown degree for the true extent of the differences between the groups (Cook and Campbell, 1979).

A second limitation was that using analysis of covariance reduced the number of students available for any of the analyses of outcomes to those who had a full set of demographic information (i.e., the variables listed above.) The effect of eliminating children who were missing demographic information was quite severe for some of the analyses, but the alternative of including these children when nothing was known about them was even more untenable. Information about the extent of missing data for each of the cohorts on the demographic variables is presented in Appendix C.

It should be pointed out that the capability of analysis of covariance to meaningfully correct for pre-existing differences has been questioned by some research methodologists. Some hold to the position that, as expressed by Lord (1967), "...there is no logical or statistical procedure that can be counted on to make proper allowances for pre-existing differences between groups (p. 305). " Others feel useful conclusions can be drawn when the technique is applied cautiously (Wolf, 1981; Reichardt, 1979). With regard to this particular study, there was disagreement among methodologists contacted as to whether the analysis was appropriate[1] or inappropriate[2]. If one holds that the technique is inappropriate, the implication is not that a different set of conclusions should be drawn. Rather the conclusion is that nothing can be said about the effect of Head Start given these two nonequivalent groups.

Several experimental analyses were conducted on the Head Start study data to explore the effect on the findings of varying the analytic procedure. The results of these analyses, which are presented in Appendix G, supported the approach selected. As further support of the technique, it should be pointed out that a similar analysis was recently used in a study for the Maryland State Department of Education which examined participation in a state-funded program for preschool children from low income families. This study controlled for demographic variables such as mother's education and income level (as measured by participation in the free and reduced lunch program) to examine the effect of program participation on school performance (Darlington, Hudson, and Rubenstein, 1983).

Before leaving this discussion of the analytic approach, one last issue which merits discussion is the question of why adjust at all. If the purpose of Head Start is to help children "catch up," then isn't the real issue with regard to the Head Start graduates "did they or did they not catch up with the other students in the school system and did they stay caught up?" This is certainly an important question and is the focus of Part 2, which presents the outcome data for the Head Start sample in comparison to the other students in MCPS. The numbers which are reported in Chapters 6 and 7 provide a clearer picture of how the Head Start graduates

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1. Linn, R., Personal communication, 1984; Darlington, R., Personal communication, 1984; Bryk, A. Personal communication, 1984.
2. Cooley, W., Personal communication, 1984.

fared because the data are unadjusted. Generally, however, in educational research, the question of program impact is examined by looking at whether a program improves performance of one group over that of a similar group, i.e., in this study, the Head Start and the comparison group. Whether that impact is sufficient to allow the students to perform successfully compared to any peer group is an entirely separate issue. To take an example from a different realm, a reading program that improves reading performance by two grade levels in one year's time is admirable, but it still leaves a group that was four years behind in need of help. The contrast between the Head Start group and the comparison group can show what the program did; other factors come into play in deciding how much difference is enough.

There are two very distinct issues being addressed in the two parts of this study. One relates to the impact of participating in Head Start. To answer that question, the performance of the Head Start graduates is contrasted with that of the comparison group through analysis of covariance (Chapter 3). Part 2 is concerned with the issue of how the Head Start graduates, a low-income population, have fared in the Montgomery County Public Schools. A picture of their absolute performance is provided by comparing their performance to the rest of the MCPS population (Chapter 6). The fact that there are enormous differences between these two groups as the data presented in Chapter 6 show does not indicate that Head Start has been ineffective. The interpretation of these differences is not straightforward and is discussed in the concluding chapters.

PART 1

THE EFFECTIVENESS OF HEAD START

CHAPTER 3

THE EFFECT OF HEAD START PARTICIPATION

SUMMARY

To examine the effect of participating in Head Start, the performance of the Head Start graduates was compared with that of a group of applicants who did not attend. These analyses focused primarily on the Head Start class of 1970-71. There were a number of statistically significant differences between the Head Start and the comparison students from 1970-71. The Head Start graduates scored higher on several subtests of the standardized tests administered at Grade 3, 5, 7, and 11. For Grade 11, the difference on the Total score was also statistically significant. There were also significantly more Head Start students who scored above the 80th percentile on the tests at Grades 3, 5, and 7, and fewer who scored below the 40th at Grade 11. At nearly every year, between Grade 1 and Grade 11, there were proportionally more comparison than Head Start students who had repeated a grade. This difference was statistically significant only at Grade 10 (34% Head Start vs. 55% comparison). A higher percentage of the Head Start graduates was enrolled in advanced courses in Grade 11. There was also a higher percentage at Grade 10 and a lower percentage in remedial courses at Grades 10 and 11, but these differences were not statistically significant. The Head Start graduates received a higher percentage of A's and B's and a lower percentage of poor grades in 1981-82 . The same pattern held for 1980-81, but the difference was not statistically significant. Based on a ranking system which included a number of measures of performance from first through eleventh grade, statistically more Head Start graduates received rankings of "average" or above. Other differences which favored Head Start but did not reach significance included the average GPA, the average overall rank, and the percentage of students who left school under negative circumstances. There were no differences in percentage of attendance. The data for special education showed fewer comparison students in high level special education, but the differences were not statistically significant.

A comparison of outcomes across the three years of Head Start graduates showed that trends seen in the 1970-71 data held for the other two groups but the differences between the Head Start and comparison students were much smaller.

The effect of Head Start participation was examined by contrasting the performance of the Head Start graduates with that of the comparison students who did not attend. The analyses reported in this chapter focused primarily on the Head Start class of 1970-71 because they had been in MCPS the longest and because they had the most comprehensive set of data. The concluding section of the chapter presents information on the other two cohorts with additional data on their performance in Appendices D and E.

THE STUDENTS BEING FOLLOWED

A child who applied to Head Start in 1970-71 as a four year old and advanced a grade each subsequent year was in Grade 12 for school year 1983-84. In 1970-71, 458 students were enrolled in Head Start and attended for eight or more months. Another 153 students applied but either never attended or

attended for less than a month. For 1971-72, the students' kindergarten year, 85 percent of the Head Start graduates were enrolled in MCPS. Of those who did not attend Head Start, only 67 percent were enrolled for that year. For school year 1982-83, when the students were in Grade 11, 64 percent (N=294) of the students who attended Head Start were still enrolled in MCPS. The corresponding figure for the other group of students was 41 percent (N=62). The percentages of each group in MCPS each year between 1972 and 1983 are presented in Appendix B.

Comparison of the demographic data showed that the Head Start group was different in some important ways from the other students.[1] The average family income for the Head Start group was $4685 in 1970; the corresponding figure for the comparison group was $6737 ($p<.01$). The comparison group also had statistically fewer single parent families, fewer people in the household, higher per person income, and more highly educated mothers.

Interestingly enough, the differences between the Head Start and comparison students who remained in MCPS through Grade 11 were larger than between the original two groups. The higher-income Head Start families and the lower-income comparison families left the county. For the Head Start students who were continuously enrolled between 1980 and 1984, the average family income was $4626 in 1970. The average for the comparison students continuously enrolled was $8156 ($p<.01$). Appendix C presents additional demographic data, including the characteristics of the samples in 1971 and in 1983, and a comparison within each of the two groups of the students who left versus the students who were still enrolled in 1983.

ATTENDANCE

Attendance was calculated by dividing the number of days the student was present by the total number of days in that particular school year. Table 3.1 presents the attendance data at five time points for the Head Start and comparison students. There were no significant differences in attendance in any of the years. These data are graphed in Figure 3.1.

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1. A sizable percentage of the Head Start and comparison students were missing some piece of demographic data. For example, family income was not available for 27 percent of the Head Start students and 33 percent of the comparison group. Mother's education was not available for 18 percent of the Head Start students and 34 percent of the comparison group. Because the statistical techniques used to analyze the outcome measures controlled for demographic differences, any student without a complete set of demographic data had to be excluded from the analysis. This resulted in a substantial reduction in sample size for any of the comparisons between the two groups of students. Additional information about the amount of missing data is presented in Appendix C.

TABLE 3.1

Average Attendance
(1970-71 Cohort)

	Grade K 1971-72	Grade 1 1972-73	Grade 4 1975-76	Grade 7 1978-79	Grade 10 1981-82
Head Start					
Average	87	92	94	90	85
N =	219	213	197	199	183
Comparison					
Average	90	91	92	89	79
N =	38	38	33	34	29

TEST PERFORMANCE

The students took a number of standardized tests over the years. In elementary school, they took the Cognitive Abilities Test and the Iowa Test of Basic Skills every other year from the third through the seventh grade. This particular cohort of students missed a year of testing in the switch to the California Achievement Tests in 1980-81, and their next year of participation in the standardized testing program was in Grade 11 with the California Achievement Tests. They also took the Maryland Functional Reading Test in Grades 7 and 9.

Tables 3.2 through 3.4 present the results of the Cognitive Abilities Test and the Iowa Test of Basic Skills administered in third, fifth, and seventh grades. These data include all third (or fifth, etc.) scores available including scores for those who had been retained and thus took the test a year after their on-grade level agemates. The percentage of students whose data are from a later year is shown in each table. The results are presented in NCEs (Normal Curve Equivalents.) For the reader unfamiliar with NCEs, an NCE of 50 corresponds to the 50th percentile, and an NCE of 60 corresponds to the 68th percentile. NCEs have a standard deviation of 21.

The Grade 3 Iowa Test of Basic Skills showed a consistent pattern of higher scores for the Head Start group. The differences were statistically significant for the Vocabulary, Reading, and Punctuation tests. On six of the other eight subtests and the composite score, the Head Start average was numerically higher, but the difference was not statistically significant.

On the Grade 5 Cognitive Abilities Test, the Head Start average was higher for all three subtests, and two of the three were statistically significant. The largest difference was 10 NCE points on the quantitative portion of the test.

Figure 3.1
Average Attendance for
Head Start Students and Comparison Group
(1970-71 Cohort)

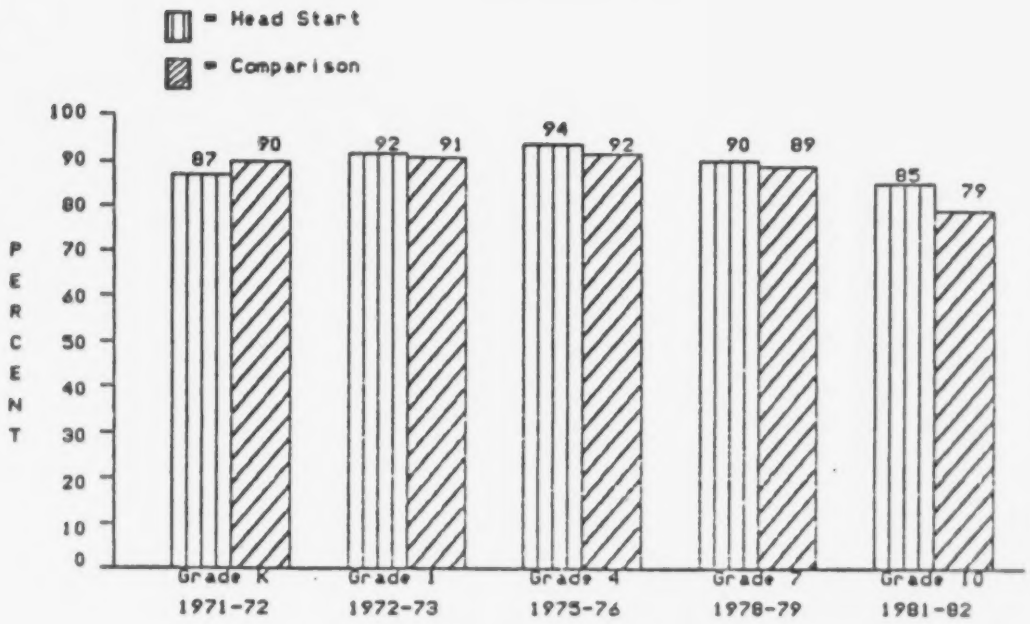


TABLE 3.2

Mean NCEs for Grade 3
(1970-71 Cohort)

	Head Start	Comparison
Cognitive Abilities Test		
Not enough scores were located in the records.		
Iowa Test of Basic Skills	(N = 169)	(N = 26)
Reading		
Vocabulary	38	29*
Reading Comprehension	36	27*
Language		
Spelling	43	35
Capitalization	43	40
Punctuation	46	37*
Language Usage	38	32
Work Study Skills		
Map Reading	38	38
Graphs and Tables	40	43
Reference Material	37	34
Math		
Math Concepts	36	34
Math Problems	40	38
Composite	35	30

Note: Head Start and comparison scores have been adjusted for demographic differences. Some students took the test a year after the others: 17 percent of the Head Start students (N=28) and 12 percent of the comparison students (N=3).

*p <.05.

TABLE 3.3

Mean NCEs for Grade 5
(1970-71 Cohort)

	Head Start	Comparison
Cognitive Abilities Test	(N=165)	(N=29)
Verbal	41	35
Quantitative	43	33**
Nonverbal	48	40*
Iowa Test of Basic Skills	(N=157)	(N=28)
Reading		
Vocabulary	35	30
Reading Comprehension	35	27*
Language		
Spelling	41	32*
Capitalization	40	35
Punctuation	40	35
Language Usage	36	31
Work Study Skills		
Map Reading	40	36
Graphs and Tables	41	35
Reference Material	40	32*
Math		
Math Concepts	38	33
Math Problems	38	34
Composite	34	29

Note: Head Start and comparison scores have been adjusted for demographic differences. Some students took the test a year after the others: 15 percent of the Head Start students (N=24) and 25 percent of the comparison group (N=7).

*p <.05
**p <.01

TABLE 3.4

Mean NCEs for Grade 7
(1970-71 Cohort)

	Head Start	Comparison
Cognitive Abilities Test	(N=156)	(N=25)
Verbal	40	35
Quantitative	43	29***
Nonverbal	50	43
Iowa Test of Basic Skills	(N=152)	(N=25)
Reading		
Vocabulary	34	30
Reading Comprehension	33	28
Language		
Spelling	38	32
Capitalization	39	31
Punctuation	39	39
Language Usage	36	34
Work Study Skills		
Map Reading	40	39
Graphs and Tables	38	36
Reference Material	38	33
Math		
Math Concepts	37	32
Math Problems	37	30
Composite	32	29

Note: Head Start and comparison scores have been adjusted for demographic differences. Some of the students took the test a year after the others: 16 percent of the Head Start students (N=24) and 25 percent of the comparison group (N=4).

***p <.001.

The Grade 5 Iowa Test of Basic Skills showed a similar pattern. For all of the subtests, the Head Start group averaged a higher score. The difference was statistically significant for Reading Comprehension (35 vs. 27, $p < .05$), Spelling (41 vs. 32, $p < .05$), and Reference Material (40 vs. 32, $p < .05$).

The Cognitive Abilities Test for Grade 7 favored Head Start by a difference of 5 to 14 NCE points. The 14 point difference on the quantitative test was statistically significant ($p < .001$).

The Grade 7 Iowa Test of Basic Skills showed a small difference in favor of Head Start on all but one of the scores, however, none of the differences were large enough to be statistically significant. The largest difference was eight NCE points on capitalization.

The results of the California Achievement Tests administered in Grade 11 are presented in Table 3.5. Only students in Grade 11 in 1982-83 are included; and, therefore, data were available for only 93 Head Start students and 16 students from the comparison group. The comparisons overwhelmingly favored Head Start with 5 of the 12 being statistically significant. The difference in the average score on the Total Battery was 12 NCE points (45 vs. 33, $p < .05$).

The Maryland Functional Reading Test was administered in Grades 7 and 9. The results are shown in Table 3.6 for the students who were on grade level and for those whose grade placement was one year behind and who subsequently took the test one year later.

The Maryland Functional Reading Test results present a pattern generally favorable to Head Start with few significant differences. For those who were on grade level in Grade 7, the Head Start and comparison students performed very similarly. However, for those who had been retained, the comparison students outperformed the Head Start students on all sections of the test, with the 16-percentage-point difference on "Follow Directions" reaching statistical significance. In the ninth grade, the Head Start students who were on grade level did slightly better than the comparison group, but the difference was significant only for "Locate Information." The pattern was similar for the retained students in ninth grade with no significant differences.

One last analysis of test scores examined the percentage of students who had done well or poorly on a test. An "academic success" was defined as a student who had scored above the 80th percentile on the standardized test. A student with problems was one who scored below the 40th. The percentages of students in each of these groups for the testing conducted in Grades 3, 5, 7, and 11 are shown in Table 3.7.

The data on low and high scorers reveal several things. First, there were substantially more low scorers than there were high scores. For example, the adjusted percentages for Head Start in Grade 3 show that 7 percent of the students scored above the 80th percentile and 63 percent scored below the 40th. Secondly, all of the adjusted numerical comparisons favor the Head Start students, with half of them being large enough to reach statistical significance. The difference in the Grade 11 percentage of low scorers is especially large, 47 percent of the Head Start group compared to

TABLE 3.5

Mean NCEs for Grade 11
California Achievement Tests in 1983-84
(1970-71 Cohort)

	Head Start	Comparison
N =	93	16
Reading Vocabulary	43	33
Reading Comprehension	45	37
TOTAL READING	44	35
Spelling	46	35
Language Mechanics	45	40
Language Expression	45	30*
TOTAL LANGUAGE	45	34
Math Computation	47	39
Math Concepts and Applications	47	33**
TOTAL MATHEMATICS	47	36*
Reference Material	51	36**
TOTAL BATTERY	45	33*

Note: Head Start and comparison group scores have been adjusted for demographic differences.

*p <.05
**p <.01

TABLE 3.6

Average Percentage Correct on
Maryland Functional Reading Test
(1970-71 Cohort)

	Grade 7		Grade 9	
	Head Start	Comparison	Head Start	Comparison
On Grade Level	Year: 1979-80		Year: 1981-82	
	(N=150)	(N=23)	(N=130)	(N=23)
Locate Information	80	79	80	73*
Understand Forms	76	80	83	81
Gain Information	76	76	84	82
Follow Directions	83	82	90	88
Total	79	79	84	81
One Year Below Grade Level	Year: 1980-81		Year: 1982-83	
	(N= 33)	(N= 8)	(N= 47)	(N=10)
Locate Information	65	81	73	67
Understand Forms	60	82	77	74
Gain Information	62	76	75	73
Follow Directions	74	90*	83	84
Total	66	82	77	75

Note: Average adjusted to correct for demographic differences between the groups.

*p <.05

TABLE 3.7

Percentage of Students Scoring High and Low on
Standardized Achievement Tests
(1970-71 Cohort)

	Percentage of Students	
	Head Start	Comparison
Grade 3	(N = 169)	(N = 26)
Below 40th Percentile	63	76
Above 80th Percentile	7	-3*
Grade 5	(N = 157)	(N = 28)
Below 40th Percentile	68	81
Above 80th Percentile	4	-7**
Grade 7	(N = 152)	(N = 25)
Below 40th Percentile	66	81
Above 80th Percentile	4	-4*
Grade 11	(N = 93)	(N = 16)
Below 40th Percentile	47	85*
Above 80th Percentile	8	-3

Note: Percentages have been adjusted to correct for demographic differences between the groups.

*p <.05
**p <.01

85 percent of the comparison students. There were, however, only 16 comparison students who took the test. Most of the statistically significant differences occurred with the difference in the percentage of high scorers. Because of the low percentages of high scorers, the correction for demographic differences (which, in effect, takes percentage points away from the comparison group) reduced the comparison group percentages to less than 0 at all four time points.

RETENTION

The retention analysis for the 1970-71 Head Start students also included students who were in special education placements. Although these students were officially in Grade 16, the schools considered the students as being in a certain grade level for various administrative purposes (e.g., when the child should leave elementary school). These grade levels were used in the analysis so that the special education students could be included.

The adjusted percentage of each of the groups (Head Start or comparison) who were below grade level at each year is shown in Table 3.8. The percentage retained gets bigger each year because the measure is the percentage of students who at that point in time had ever been retained. All of the numerical comparisons favor Head Start, and the difference in 1981-82 is statistically significant. (Most of the other comparisons border on statistical significance.) The increasing difference between the two groups is graphically presented in Figure 3.2

SPECIAL EDUCATION

Special education students were classified in two ways: those receiving any special education and those receiving Level 4 or more (special class or special school). The category of "any special education" includes those children with a handicapping condition who received any kind of special services regardless of intensity during that year. "Level 4 or more" refers to students who were placed in a special class or special school. The data for the students' elementary school years should be interpreted somewhat cautiously because the review of the records indicated that documentation of special education service was not nearly as thorough ten years ago as it is today. It is clear that at least the percentage of students in the table received special education; it is unclear as to how many more students without any records to that effect also received services. There is, however, no reason to suspect the proportion of undocumented services should differ for the Head Start and comparison groups.

The top half of Table 3.9 presents the percentage of students who were receiving <u>any</u> special education for each year. The data favor the comparison group very slightly. None of the differences was statistically significant.

The bottom half of Table 3.9 presents special education data for students who were placed in a special class or a special school. These data are graphed in Figure 3.3. Again, the numbers favor the comparison group but the differences are slight; and none was statistically significant although the difference for 1980-81 (19% Head Start versus 5% comparison students) approached significance (p=.06).

TABLE 3.8

Percentage of Students Retained by Each Grade Level
(1970-71 Cohort)

	Grade 1 1972-73	Grade 2 1973-74	Grade 3 1974-75	Grade 4 1975-76	Grade 5 1976-77	Grade 6 1977-78	Grade 7 1978-79	Grade 8 1979-80	Grade 9 1980-81	Grade 10 1981-82	Grade 11 1982-83
Head Start											
Percentage	2	12	15	15	15	17	17	21	26	34	37
N =	224	220	217	211	213	213	210	207	207	202	185
Comparison											
Percentage	8	12	20	27	26	26	28	36	40	55*	53
N =	40	38	38	38	37	37	37	36	37	33	30

Note: Percentages have been adjusted for demographic differences between the two groups.

*Difference between Head Start and comparison group statistically significant, $p < .05$.

Figure 3.2
Cumulative Percentage of Students
Below Grade Level at Each Year
(1970-71 Cohort)

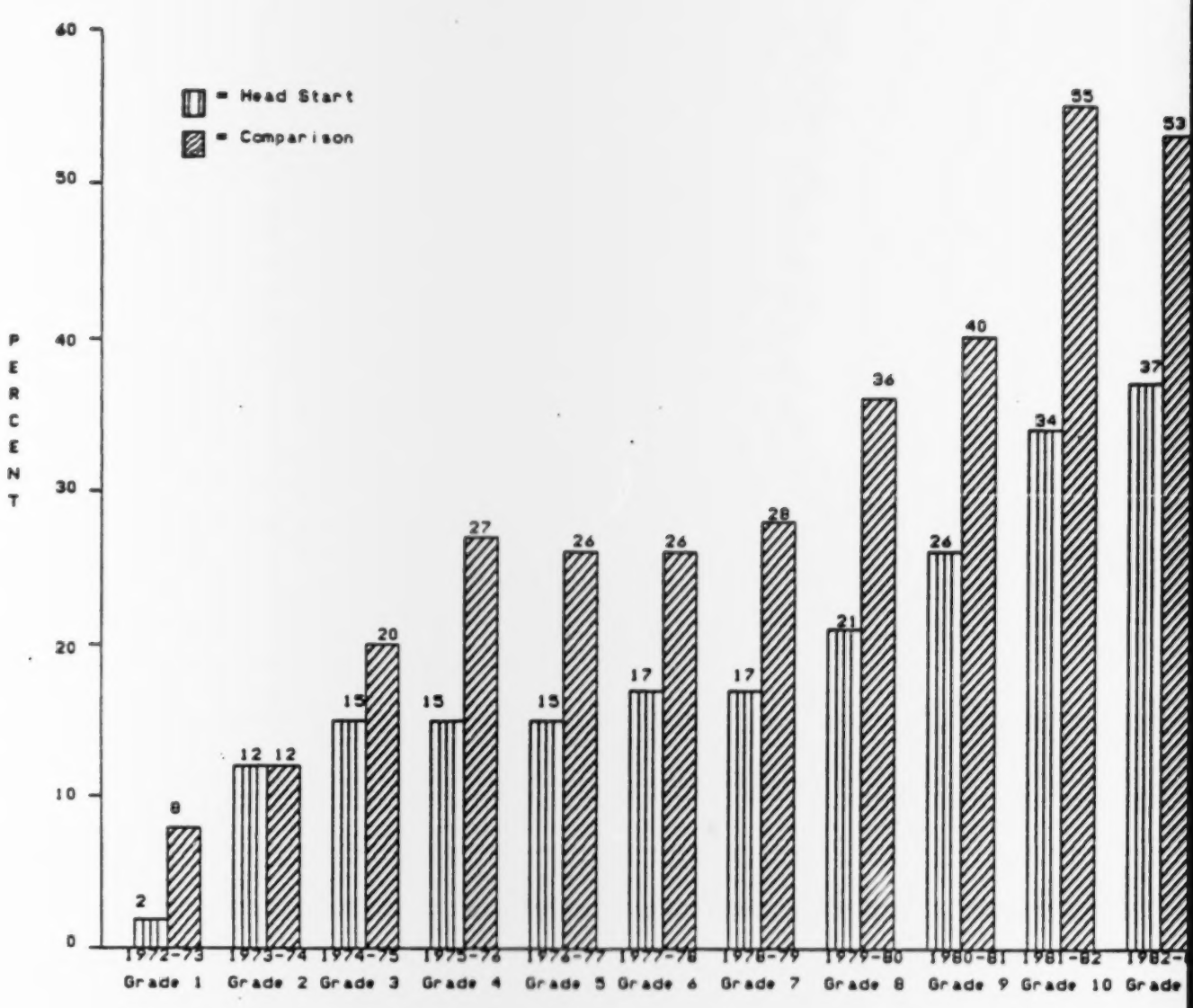
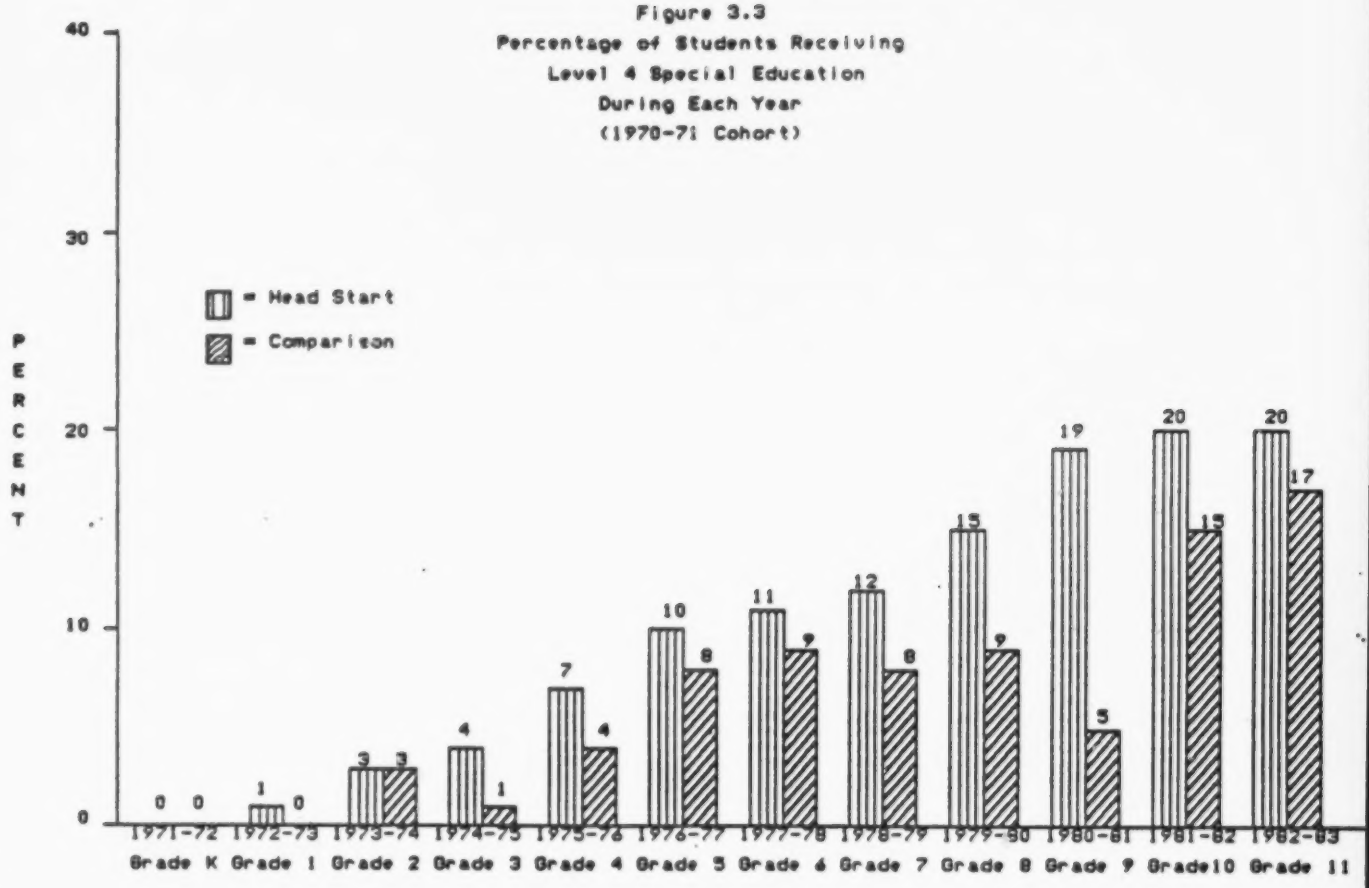


TABLE 3.9

Percentage of Students Receiving Special Education
(1970-71 Cohort)

	Grade K 1971-72	Grade 1 1972-73	Grade 2 1973-74	Grade 3 1974-75	Grade 4 1975-76	Grade 5 1976-77	Grade 6 1977-78	Grade 7 1978-79	Grade 8 1979-80	Grade 9 1980-81	Grade 10 1981-82	Grade 11 1982-83
Any Special Education												
Head Start												
Percentage	6	8	9	14	16	21	19	24	24	26	30	24
N =	226	224	221	218	212	214	212	210	207	206	203	185
Comparison												
Percentage	6	6	8	7	11	17	30	25	26	25	27	21
N =	39	40	38	38	38	37	37	37	35	36	33	30
Level 4 or More												
Head Start												
Percentage	0	1	3	4	7	10	11	12	15	19	20	20
N =	226	224	221	218	212	214	212	210	207	206	203	185
Comparison												
Percentage	0	0	3	1	4	8	9	8	9	5	15	17
N =	39	40	38	38	38	37	37	37	35	36	33	30

Figure 3.3
Percentage of Students Receiving
Level 4 Special Education
During Each Year
(1970-71 Cohort)



The two analyses of special education just discussed looked at special education as a year-to-year question, i.e., what percentage of students were in special education that year? One last analysis of special education was performed to keep track of the number of students who had ever been in special education. In this analysis, a student who had been in a special class in fourth grade would be counted as a (former) special education student in each subsequent year; and thus the percentages get progressively bigger each year. These data are presented in Table 3.10 and are graphed in Figure 3.4. There were no significant differences.

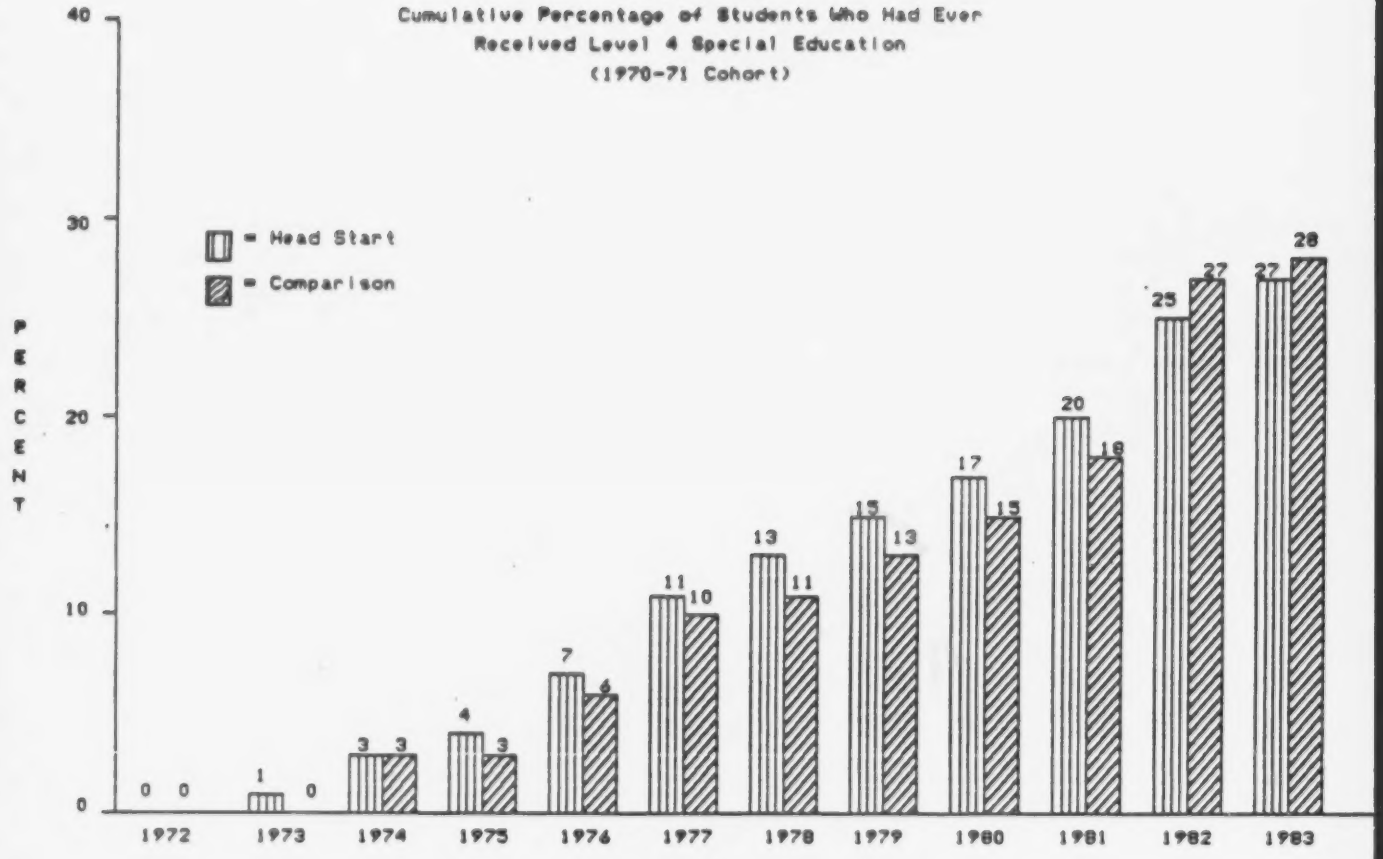
TABLE 3.10

Percentage of Students Who Had Received Level 4 Special Education
(1970-71 Cohort)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Head Start												
%	0	1	3	4	7	11	13	15	17	20	25	27
N =	228	226	222	218	212	214	212	211	207	207	204	193
Comparison												
%	0	0	3	3	6	10	11	13	15	18	27	28
N =	40	41	39	39	39	39	39	39	37	38	34	33

Note: Percentages have been adjusted to correct for demographic differences between the groups.

Figure 3.4
Cumulative Percentage of Students Who Had Ever
Received Level 4 Special Education
(1970-71 Cohort)



SPECIAL HELP IN 1982-83

One of the assumptions of this study has been that to the extent Head Start can prevent some students from requiring additional services above and beyond that provided in the regular classroom, the program is effective for students and may be cost effective for the school system as well. Given this particular orientation, it was important to learn the ways in which students required extra resources. Two ways are through repeating a grade or through special education; but there are also students who receive non-special education assistance, such as remedial reading or mathematics. This analysis looked at the number of students receiving this kind of assistance.

Through the process of doing the record reviews, it was learned that this type of extra help is in general poorly documented and that procedures for naming a service and keeping track of its provision varied quite a bit from school to school. For each student, it was determined if the student was receiving special help during school year 1982-83 by reviewing the records and discussing the students with the counselors and the remedial teacher(s). Students taking remedial courses or enrolled in WOC (Work-Oriented Curriculum), CWE (Career Work Experience), or OJT (On the Job Training) were counted as receiving special help. Corrected for demographic differences, the percentage of Head Start graduates who received special help in 1982-83 was 37, while the percentage for the comparison group was 43. This difference was not statistically significant.

COURSES

The students' course schedules for Grades 10 and 11 were examined, and the number of courses of certain types were recorded. The number of advanced placement, honors, and gifted and talented courses were recorded separately and then added together in the analysis because of the small numbers involved. The number of basic or remedial courses were also recorded. The data collectors worked closely with the counselors to determine which of a school's courses should be coded in any of the study's categories. The course data are presented in Table 3.11.

All four of the comparisons favor the Head Start group although only one was statistically significant. Both groups had a sizable percentage of students who took courses which were basic or remedial, but the comparison group appeared to have a higher average percentage. When corrected for demographic differences, the Grade 10 data indicate that the adjusted percentage of Head Start students who took remedial courses was 44 percent compared to 55 percent for the other students. The corresponding Grade 11 figures were 34 and 60 percent, respectively.

Both groups had very few students taking honors or advanced placement courses but the Head Start group had a higher percentage. In Grade 10, 3 percent of the Head Start students were enrolled in honors courses compared to 1 percent of the comparison group. In Grade 11, 5 percent of the Head Start students were so enrolled. When corrected for the demographic differences, the corresponding figure for the comparison students was -5 percent. This last differences was statistically significant ($p < .05$).

TABLE 3.11

Course Selections for Grades 10 and 11
(1970-71 Cohort)

	Percentage of Students	
	Head Start	Comparison
Grade 10	(N = 157)	(N = 22)
Basic, Remedial	44	55
Honors, Advanced Placement	3	1
Grade 11	(N = 124)	(N = 17)
Basic, Remedial	34	60
Honors, Advanced Placement	5	-5*

Note: Percentages have been adjusted to correct for demographic differences between the groups.

*p <.05

GRADES

The students' grades for 1980-81 and 1981-82 were counted and coded. Two categories of grades were computed for the analysis: "good grades" which were A's and B's and "poor grades" which were D's, E's, No Credit, Incomplete, and Loss of Credit. The student's total number of grades in each of these categories was then divided by the total number of grades for the year to get two percentages for each student. For example, if a student had 20 marks and two of them were A's or B's, that student's percentage of good grades would be 10. The average percentage of good and bad grades for the Head Start and comparison students are presented in Table 3.12.

All four of the numerical comparisons favored the Head Start students, and the differences for 1981-82 comparisons were statistically significant. In 1980-81, the average percentage of "good grades" for the Head Start students was 31 percent compared to 22 percent for the comparison students. The corresponding figures for 1981-82 were 28 and 17 percent, respectively ($p < .05$). At the other end, the 1980-81 average percentage of "poor grades" for the Head Start students was 43 percent compared to 50 percent for the comparison students. For 1981-82, 42 percent was the average of poor grades for Head Start students compared to 57 percent for the others ($p < .05$).

TABLE 3.12

Average Percentage of Courses
With Good and Poor Grades
(1970-71 Cohort)

	Head Start	Comparison
1980-81	(N = 194)	(N = 34)
A and B	31	22
D, E, Incomplete, No Credit, Loss of Credit	43	50
1981-1982	(N = 190)	(N = 30)
A and B	28	17*
D, E, Incomplete, No Credit, Loss of Credit	42	57*

Note: Percentages have been adjusted for demographic differences.

*$p<.05$

Actual grade point averages (GPA) were analyzed for those students who were in Grade 12, i.e., on grade level for 1983-84. There were very few comparison students with data for this analysis. The average GPA for the Head Start graduates (N=86) was 2.18 compared to 2.04 for the comparison students (N=13). This difference was not statistically significant.

WITHDRAWALS

Withdrawal codes for all students in the study who were enrolled at least one year between 1980 and 1984 were manually coded from the pupil data base in August, 1984. A number of students did not enroll when they were expected to and yet there was no official withdrawal date or withdrawal code for them (for example, an eleventh grader who does not reenroll the following September). For purposes of the study, these students were considered to be "dropouts" insofar as transfers to other schools are usually accompanied by requests from the receiving school for the student's records.

For 80 percent of the Head Start students and 76 percent of the comparison students, the withdrawal codes indicated that they had not withdrawn or had withdrawn to another school. Conversely, 20 percent of the Head Start graduates and 24 percent of the comparison students had left MCPS under suspect circumstances. The data on the various types of withdrawals are presented in Table 3.13. These data were not corrected for demographic

TABLE 3.13

Reasons for Withdrawal
(1970-71 Cohort)

	Head Start		Comparison	
	N	%	N	%
Still enrolled in MCPS	87		16	
Graduated	156		28	
Transferred to a school outside MCPS	13		7	
Death	1		1	
TOTAL	257	80	52	76
Questionable Withdrawals				
Listed as transferred to another MCPS school--never showed up	7		1	
Incompatibility between student and school	26		4	
Withdrawal code missing	21		7	
Employment	6		1	
Removed by court action	4		1	
Marriage	1		2	
TOTAL	65	20	16	24

Note: Includes all students who were enrolled at least once between September 1980 and May 1984.

differences.

An analysis of withdrawal history indicated that, corrected for demographic differences, 22 percent of the Head Start graduates (N=205) and 27 percent of the comparison students (N=35) had a "questionable withdrawal" code over the past four years. This difference was not statistically significant.

OVERALL RANK

To create a measure which would encompass a number of possible outcomes, a ranking system was developed that included all students who were enrolled in either 1981 or 1982. Students were assigned a ranking of 1 to 7 with 1 being an excellent student and 7 being a student with serious problems. For example, the characteristics of students assigned a 1, 4, or 7 are illustrated in Table 3.14.

The mean point on the scale, corrected for demographic differences was 5.41 for Head Start students (N=205) and 5.83 for comparison students (N=35, $p < .16$). The adjusted percentage of students ranked as Average or above was 30 percent for Head Start and 19 percent for the others. This difference was statistically significant ($p < .01$).

COMPOSITE MEASURE FOR ALL THREE HEAD START GROUPS

This last section presents four additional measures on the 1970-71 graduates from Head Start and compares their results on these measures with those for the two younger groups of Head Start students (1974-75 and 1978-79). All information presented thus far on the 1970-71 Head Start graduates was based on information collected from student records. Several additional measures were extracted from the pupil data base and the testing tapes so that identical measures could be compared across the three years of Head Start graduates. (For the two younger cohorts, the only outcome information available was that from the pupil data base and the testing tapes.) The pupil data base has only been maintaining historical information since 1980-81, so nothing can be determined about a student's special education placement before that time. Furthermore, only current grade level is maintained on data base. Thus, while we can tell if a student is not at the proper grade level, we have no way of knowing when the retention occurred.

Four outcome measures are reported in this section for all three years of Head Start graduates. The measures are the following:

- Retention
- Placement in Level 4 or more special education during the preceding four years
- Performance on the latest administration of the California Achievement Tests
- A composite measure which included the previous three

TABLE 3.14

Ranking System

1 (Excellent):	GPA of 3.5 to 4.0
	GPA of 3.0 to 3.49 with 6 or more advanced courses
	No retentions
	Fewer than 10 special education points[a]
	No Level 5, 6, or 7 special education placements
4 (Average)	GPA of 2.0 to 2.49
	GPA of 2.5 to 2.99 with 4 or more basic courses
	GPA of 2.5 to 2.99 with 10-15 special education points
	GPA of 3.0 to 3.5 with 16-25 special education points
	"Good grades"[b] with 1 year retention
7 (Serious problems)	GPA of less than 1.49 with 4 or more basic courses
	GPA of 2.0 to 2.49 with 26 to 39 special education points
	"Poor grades"[b] with 1 year retained
	3 or more years of Level 5, 6, or 7 special education placements
	40 or more special education points
	1-2 years of Level 5, 6, or 7 special education placement and 1 year retained
	Expelled or dropped out of school

a. Special education points were computed by multiplying the level of services by the number of years at that level. For example, two years at Level 2 and one year at Level 3 equals 7 points (2 x 2 + 1 x 30).

b. GPA's were not available on students who had been retained. A "pseudo-GPA" was calculated based on grades for the previous two years.

Students were counted as needing help if they scored below the 40th percentile on the California Achievement Tests. Countywide, approximately 85 percent of MCPS students score above the 40th percentile.

The composite variable was created to account for the fact that a student may be doing poorly and yet never have been retained or placed in special education. Also, the California Achievement Tests data alone do not show the extent of problems that an entire group of students has encountered because students who have been retained or are in special education do not take the California Achievement Tests with their agemates. A student was counted as "needing help" as measured by the composite variable if the student had been retained, or been in special education, or had scored below the 40th percentile on the Total Battery of his or her latest administration of the California Achievement Tests. Additional information on the measures is presented in Appendix A. Only students who had been enrolled continuously for the past four years were included in the analysis because special education for each year had to be coded as definitely yes or definitely no. Also, any differences between these data and data presented earlier in the chapter are due to the inclusion in these numbers of only students continuously enrolled for four years.

As it turned out, this set of outcome measures was not a particularly good indicator of group performance for the 1970-71 cohort because 20 percent of the students left the school system under "questionable circumstances" between 1980 and 1984. These students were excluded from the analyses because they were not enrolled continuously for the past four years. For the secondary students, the measure underestimates the extent of problems in the group because the students with the most problems (retention, high level special education, low achievement) were generally the ones who left school. Because there were proportionally more comparison students than Head Start students who left school, the data on the composite variable and the other outcomes measures presented here are probably biased against Head Start. More of the Head Start students with problems were still enrolled to show up in these data.

The first column of Table 3.15 presents the four outcome measures for the 1970-71 cohort. All measures with the exception of special education favored the Head Start group. The difference on the percentage below the 40th percentile on the Grade 11 California approached significance ($p < .11$), and the difference on composite measure was statistically significant ($p < .05$). These differences are particularly striking, given the bias against the Head Start sample as explained above. However, there were very few comparison students who could be included in the analysis.

The second and third columns of Table 3.15 present the same data for the 1974-75 and 1978-79 groups. The data for the 1974-75 group showed that 19 percent of the Head Start graduates had been retained by eighth grade versus 21 percent of the comparison children. Fourteen percent of the Head Start children had been in a special class; the figure for the comparison group was 13 percent. On the California Achievement Tests, 29 percent of the Head Start graduates had low scores compared to 35 percent of the comparison students. Overall, by eighth grade, 49 percent of the 1974-75 Head Start students needed help compared to 54 percent of the comparison students.

TABLE 3.15

Outcome in 1983-84 for the
Three Years of Head Start Graduates

	1970-71 (Grade 12)		1974-75 (Grade 8)		1978-79 (Grade 4)	
	Head Start %	Comparison %	Head Start %	Comparison %	Head Start %	Comparison %
Retained	23 (N=111)	35 (N=19)	19 (N=334)	21 (N=78)	25 (N=287)	27 (N=31)
In Level 4 or more special education	18 (N=137)	16 (N=21)	14 (N=389)	13 (N=83)	10 (N=323)	8 (N=33)
Retained or in Level 4 or more special education	38 (N=137)	46 (N=21)	30 (N=289)	31 (N=83)	33 (N=323)	34 (N=33)
Below 40th percentile, Total Battery, California Achievement Test[a]	48 (N=80)	77 (N=13)	29 (N=261)	35 (N=65)	33 (N=217)	32 (N=24)
Retained or in Level 4 or more special education or below 40th percentile	67 (N=129)	99* (N=20)	49 (N=372)	54 (N=81)	53 (N=314)	54 (N=33)

Note: Only students enrolled continuously for the last four years are included. Percentages were computed only on students who did not have missing data for a category. Head Start and comparison group percentages have been adjusted for demographic differences.

[a]1970-71 - Administered in Grade 11
1974-75 - Administered in Grade 8
1978-79 - Administered in Grade 3

*p<.05

For the 1978-79 group, 25 percent of the Head Start graduates had been retained by fourth grade compared to 27 percent of the comparison children. Ten percent of the Head Start children had been in a special class or school compared to 8 percent of the comparison students. Over half the Head Start and comparison students (53% and 54%, respectively) had been retained or in a special class or had a Total California score below the 40th percentile.

The strongest evidence for a long-term effect of Head Start participation was provided by the 1970-71 cohort. On the four measures shown in Table 3.15, all numerical comparisons except special education favored Head Start. The only difference to reach statistical significance, however, was the composite measure (67% Head Start vs. 99% comparison). The data for the other two cohorts were generally in the same direction as those for the 1970-71 group; i.e., the Head Start children had fewer problems, but the differences between the Head Start and comparison group were very slight.

Additional findings from the 1974-75 and 1978-79 cohorts are presented in Appendices D and E, respectively. Some of the test score data reported in the Appendices did show an effect for Head Start participation with the two younger groups. The only statistically significance difference for the 1974-75 group was on the percentage of students below the 40th percentile on the fifth grade California Achievement Tests (33% Head Start, 48% comparison group). For the 1978-79 group, the only statistically significant difference was the percentage of students above the 80th percentile on the Verbal subtest of the Grade 3 Cognitive Abilities Test (a 31 percentage point difference). This Head Start group also had a larger percentage of high scorers on the other two subtests and the Total score on the California and higher mean scores on all subtests of both tests, but these differences were not statistically significant.

In sum, the results for the two younger cohorts, the eighth and fourth graders of 1983-84, are ambiguous with regard to the long-term effects of Head Start participation. The findings from these two cohorts suggested that Head Start might have had some kind of a difference, but the evidence was extremely weak. On the other hand, the performance of the 1970-71 group, the twelfth graders of 1983-84, provided overwhelming evidence of a positive long-term effect for Head Start participation. The differences on the great majority of the outcome measures favored the Head Start group, and a number of these differences were statistically significant.

CHAPTER 4

FACTORS RELATED TO LATER PERFORMANCE FOR HEAD START STUDENTS

SUMMARY

The relationships between later outcomes and possible predictors such as student background characteristics tests scores in elementary school were examined for the Head Start graduates of 1970-71. The outcomes examined included attendance, test performance, retention, special education, GPA, and withdrawal. Predictors examined included mother's education, family, income, racial/ethnic group, sex, attendance, and test performance. The inclusion of race and sex allowed these factors to be examined in connection with the other possible predictors. Mother's education and family income were related to a number of outcome measures including attendance at Grades 7 and 10, test performance, course selections, grades, retention, special education, and withdrawing from school under negative circumstances. Females scored higher than males on the standardized tests and were less likely to have been in a special education placement by Grade 11. Blacks scored lower than whites on the standardized tests (although the difference at Grade 3 could be explained as due to a difference in family income), took fewer advanced courses and more remedial courses, received lower GPA's, and were less likely to withdraw from school under negative circumstances. Test performance at Grades 3 and 5 was related to every outcome measure examined with performance at Grade 3 being nearly as strongly related to later outcomes as performance at Grades 7 and 11.

The data presented thus far have shown that one of the factors related to how a student performs by the end of secondary school is participation in a Head Start program. There are a number of other factors, such as the student's ethnicity, sex, mother's education, family income, school attendance, and earlier test performance, which might also be related to later outcomes. This chapter explores the relationship between possible predictive factors and later outcomes for students whose records were reviewed as part of the follow-up on the 1970-71 Head Start applicants (Grade 12 in 1983-84).

To simplify the interpretation of the data, only those students who attended Head Start for eight or more months were included in these analyses. To provide somewhat of a longitudinal picture, only students still enrolled in 1980-81 or 1981-82 were included. Also, only white and black students were included since there were so few of the other minority groups, especially in the later years. It is unknown whether or not the relationships uncovered for these students would also hold for the MCPS population in general. These students are not representative of the Montgomery County student population; in fact, they represent a unique subset of students. Their outcomes and the factors related to them, however, are important for understanding what happens to low-income students in MCPS.

THE FACTORS EXAMINED

Six background variables were included in all of the analyses. They were the following:

- Mother's education
- Mother's occupation
- Family income
- Per person income
- Number of people in the household
- Number of parents in the household

Additional information about the collection and coding of these variables is included in Appendix C. Because of missing data, any analyses involving these variables had fewer cases.

Two other variables were also included in every analysis. They were the following:

- Sex (1=male, 2=female)
- Ethnicity (1=black, 2=white)

The outcome measures examined were attendance and test performance both of which were collected at various points throughout the student's career, in addition to all of the other outcome measures discussed earlier for the Grade 12 students.

ATTENDANCE

Attendance information was collected at five time points from kindergarten through Grade 10. Table 4.1 presents the correlations between attendance and the demographic variables. Although mildly related to some of the demographic variables, the best predictor of attendance was attendance at an earlier time point. The strongest relationship for the demographic variables was between mother's education and attendance in Grade 10 (r=.20). Attendance in kindergarten was related to attendance in Grade 10 (r=.23), but the relationship was only half the size of the relationship between attendance in Grades 7 and 10 (r=.47).

TEST PERFORMANCE

As the data to be presented later will show, performance on standardized tests in elementary school was related to a number of outcomes in secondary school. What predicts test performance? The correlations between the students' test scores and the other indicators are presented in Table 4.2. Of the demographic variables, mother's education, family income, and per person income showed a moderate and incredibly consistent relationship with test performance year after year. Mother's education was correlated .24 with the Composite of the third grade Iowa Test of Basic Skills and .34 with the Total Battery of the Grade 11 California Achievement Tests. The corresponding correlations for family income were .28 and .26.

TABLE 4.1

Correlations with Attendance

	N	Attendance for 71-72 Grade: K	72-73 1	75-76 4	78-79 7	81-82 10
Mother's Education	257-273	-	-	-	.14*	.20*
Mother's Occupation	291-313	-	-	-	-	-
Family Income	238-256	.12	.13	-	.14	.12
Per Person Income	236-254	-	-	-	.14	-
Number of People	315-339	-	-	-	-	-
Number of Parents	296-318	-	.14*	.13*	-	-
Sex	323-347	-	-	-	-	-
Ethnicity	325-349	-	-	-	-	-.11
Attendance 71-72	296-328		.61**	.36**	.27**	.23**
Attendance 72-73	300-328			.53**	.30**	.20**
Attendance 75-76	300-324				.44**	.27**
Attendance 78-79	305					.47**

(no star) p <.05
* p <.01
** p <.001

TABLE 4.2

Correlations with Test Scores

	N	Grade:	Iowa Composite 3	5	7	Calif. Tot.[a] 11
Mother's Education	127-222		.24**	.27**	.24*	.34**
Mother's Occupation	142-250		-	-	-	-
Family Income	116-209		.28**	.28**	.26**	.26*
Per Person Income	114-207		.28**	.26**	.22*	.27*
Number of People	153-266		-.18*	-.16*	-	-
Number of Parents	145-254		-	-	-	-
Sex	158-275		-	.14	.13	.20*
Ethnicity	159-276		.24**	.22**	.29**	.36**
Attendance 71-72	154-262		-	-	-	-
Attendance 72-73	155-265		-	-	-	-
Attendance 75-76	148-263		-	-	-	-
Attendance 78-79	155-257		-	-	-	-
Attendance 81-82	154-242		-	-	-	-
Iowa - Gr.3	134-233			.82**	.77**	.74**
Iowa - Gr.5	131-227				.84**	.81**
Iowa - Gr.7	142					.86**

a. Includes only students on grade level

(no star) $p < .05$
* $p < .01$
** $p < .001$

Sex was not related to test performance at Grade 3, was weakly related at Grade 5 (r=.14), and had become more strongly related by Grade 11 (r=.20). The females received the higher scores. Ethnicity showed a similar pattern of an increasing relationship as the students got older. The correlation between ethnicity and the Grade 3 scores was .24; for the Grade 11 scores, it was .36. The white students received the higher scores.

By far, the strongest predictor of test performance was performance on a previous test. The correlation between the Grade 3 scores and the Grade 11 scores was a very high .74. This means that 54 percent (r^2) of the variance in the Grade 11 scores could be accounted for by the Grade 3 scores. The correlation between the Grade 7 scores and the Grade 11 scores was even higher at .86. These high correlations mean that the students displayed a similar pattern of achievement year after year, test after test. The high scorers continued to score high, the low scorers continued to score low.

A regression analysis was used to explore the relationship between all possible predictors of Grade 3 test performance (the demographic variables, sex, ethnicity, and attendance). All black and white Head Start graduates with a complete set of data were included (N=150). Regression provides information about the effect of a variable when controlling for all other variables, for example, the effect of ethnicity when income is held constant. Three variables emerged as making significant contributions to the amount of variance explained. A weighted combination of mother's education, family income, and sex was able to account for 14 percent of the variance in Grade 3 scores.

The regression analysis provided several insights not available through the correlation coefficients. First, the amount of variance accounted for was higher when the variables were combined. With regard to mother's education, income, and sex, this indicates that each factor was important in its own right when the others were held constant. By "changing" any of them in the "positive" direction, a student's score would go up. If all of them were changed the student's score would go up even more. Second, sex of student emerged as a contributing factor even though it had not with the correlations. This was because the females in the study were from lower income families. With income controlled, it was true that sex was related to Grade 3 scores and that the females scored higher than the males. Third, just the opposite pattern held for ethnicity. The blacks in the sample were from lower-income families. With income controlled statistically, there was no longer a relationship between ethnicity and Grade 3 test scores.

A regression analysis was performed to examine the factors contributing independently to the Grade 11 Total Score on the California Achievement Tests. The number of students with Grade 11 scores (N=56) was much smaller than the number with third grade scores because many of the students had either left the system, been retained, or placed in special classes. The amount of variance accounted for by the regression equation was 80 percent. The three variables which contributed significantly to the variance explained were the Grade 7 scores, the Grade 5 scores, and ethnicity. The Grade 7 score accounted for 71 percent of the variance by itself; the other two factors added the other 9 percent. The emergence of ethnicity as a significant factor means that with the differences in the Grade 7 and Grade 5 scores controlled, ethnicity was responsible for some of the difference in the Grade 11 scores. Expressed another way, black and white students with

identical Grade 5 and Grade 7 scores would be expected to score differently on the Grade 11 scores, with the black students scoring lower.

COURSE SELECTIONS

Table 4.3 presents the correlations between course selections in Grade 10 and Grade 11 and the other factors discussed thus far. Only 5 percent of the sample had taken advanced courses. The preschool demographic variables of mother's education, family income, and per person income were consistently related to taking advanced courses with correlations of .16 to .39. Basic courses, which were taken by 47 percent of the students in Grade 10 and 35 percent in Grade 11, did not appear to be linked to the preschool variables. Ethnicity was weakly related to taking advanced courses (r's of .15 and .16) and to taking basic courses in Grade 10 (r=-.16). White students had taken more advanced courses; black students had taken more basic courses.

The strongest relationships were found between course selection and test performance. Surprisingly, test performance at Grade 3 was nearly as good a predictor as performance at Grades 7 or 11. The correlation between Grade 3 scores and taking an advanced courses in Grade 10 was .40; for the Grade 11 scores (the test was administered a year after the advanced course was taken), it was .49. The relationship between test scores and taking basic course was weaker but only slightly with most of the correlations being between -.30 and -.40.

The regression analysis on taking advanced courses at Grade 10 showed only the Grade 7 scores, and mother's occupation made significant and independent contributions to the outcome (N=82). Together they accounted for 15 percent of the variance. The Grade 7 scores accounted for 10 percent, and mother's occupation contributed another 5 percent. The direction on mother's occupation was that those students whose mothers were employed at the time of Head Start application in higher status jobs or who were employed at all (not employed was the bottom point on the scale) were more likely to have taken advanced courses.

The regression analysis on taking basic courses in Grade 10 showed that when the Grade 7 scores were controlled for, no other factor contributed a significant amount to the variance. Thirteen percent of the variance was accounted for by the Grade 7 scores.

GRADES

The best measure of performance in secondary school was GPA which is discussed in the next section. However, GPA's were available only for the students who were on grade level. To examine the performance of a larger number of students, the percentages of high and low grades were used as outcome measures. The correlation between the possible predictors and grades in 1981 and 1982 are presented in Table 4.4.

TABLE 4.3

Correlations with Courses

	N	Advanced Courses[a] Grade 10	Advanced Courses[a] Grade 11	Basic Courses[a] Grade 10	Basic Courses[a] Grade 11
Mother's Education	174-223	.20*	.23*[a]	-	-
Mother's Occupation	202-259	-	-	.11	-
Family Income	157-208	.16*	.39**	-	-
Per Person Income	155-206	.21*	.37**	-	.15
Number of People	215-277	-	-	-	-
Number of Parents	205-264	-	-	-	-
Sex	221-286	-	-	-	-
Ethnicity	223-288	.16*	.15	-.16*	-
Attendance '72	213-272	-	-	-	-
Attendance '73	216-273	-	-	-	-
Attendance '76	206-268	-	-	-	.15
Attendance '79	215-274	-	-	-	-
Attendance '82	211-265	-	-	-	-
Iowa - Gr. 3	170-215	.40**	.33**	-.31**	-.28**
Iowa - Gr. 5	164-213	.41**	.37**	-.33**	-.35**
Iowa - Gr. 7	176-223	.42**	.38**	-.34**	-.36**
California - Gr. 11[a]	156-158	.49**	42**	-.47**	-.38**

a. 0=No, 1=Yes

b. Only for students on grade level.

(no star) p <.05
* p <.01
** p <.001

TABLE 4.4

Correlations with Grades

	N	Percent of Courses With A and B's '81	A and B's '82	D, E, LC, NC, Inc.[a] '81	D, E, LC, NC, Inc.[a] '82
Mother's Education	267-276	.13	.13	-.10	-
Mother's Occupation	307-317	-.12	-.16*	.10	.10
Family Income	249-258	.16*	.19*	-	-.13
Per Person Income	247-256	.13	.12	-	-
Number of People	329-342	-	-	-	-
Number of Parents	312-322	-	-	-	-
Sex	338-351	-	-	-.11	-
Ethnicity	340-353	-	-	-	-
Attendance '72	315-324	.12	-	-	-.11
Attendance '73	317-327	.10	.10	-.14*	-.17*
Attendance '76	315-327	.11	.10	-	-.13
Attendance '79	319-331	.19**	.18*	-.18**	-.22**
Attendance '82	310-316	.35**	.38**	-.34**	-.53**
Iowa - Gr. 3	259-265	.30**	.36**	-.24**	-.26**
Iowa - Gr. 5	245-253	.40**	.41**	-.32**	-.33**
Iowa - Gr. 7	255-261	.35**	.37**	-.28**	-.25**
California - Gr. 11[b]	159	.51**	.53**	-.50**	-.37**

a. D, E, Loss of Credit, No Credit, Incomplete.

b. Only for students on grade level.

(no star) $p < .05$
* $p < .01$
** $p < .001$

There were weak correlations between the demographic variables and the percentage of A's and B's. Mother's education, mother's occupation, family income, and per person income were all related with correlations between .10 and .20. (The direction on mother's occupation was that being unemployed or employed in a low status job was related to a smaller percentage of A's and B's.) There were fewer relationships between the demographics and the percentage of low grades and the correlations were smaller.

Attendance was related to grades in secondary school. The relationship was weak in the early years and became progressively stronger. Of course, the relationship between poor grades and attendance in 1982 (r=-.53) is a reflection of the same phenomenon: students who don't come to school have a higher percentage of failing grades and loss of credits.

Test performance at all time points was related to grades in 1981 and '82. The Grade 3 scores were just as good at predicting secondary grades as the Grade 5 or 7 scores. The Grade 3 Iowa scores (taken in 1975) were correlated .36 with the percentage of A's and B's in 1982; the correlation with the Grade 7 scores was .37. The correlations with the Grade 11 California scores were higher, but the test score and the grades are from the same time period.

Regression analyses were performed using the high and low grades in 1981 as the dependent variables. Test scores at Grade 3, 5, and 7 were included as possible predictors which meant that all students who were in special education placements in any of those grades were eliminated from the analyses (as were all students with missing demographic data). The number of students included in the regressions was 103.

The combination of the test scores in Grade 7 and attendance in 1979 accounted for 25 percent of the variance in the percentage of A's and B's in 1981. No other factor made a significant contribution to the variance when these measures were controlled. The regression on low grades in 1981 showed that test scores at Grade 5, attendance in 1979, and family income were able to account for 29 percent of the variance. Surprisingly, family income was directly related to the percentage of low grades: with the Grade 5 scores and the attendance controlled, those Head Start students from families with the higher incomes had the highest percentage of low grades.

OTHER OUTCOMES

Table 4.5 presents the correlations between the earlier factors and several important outcomes. They are the following:

- Retention by 1983
- High level special education by 1983
- Grade point average (only for students on grade level)
- Withdrawal from school under negative circumstances
- Overall rank (described in Chapter 3)

With the exception of GPA, all of the outcome measures are negatively scaled; that is, a higher score indicates a negative outcome. Thirty-nine

TABLE 4.5

Correlations with Other Outcomes

	N	Retention '83[a]	High Spec Ed. '83[a]	GPA[b]	Bad Withdrawal[a]	Rank[c]
Mother's Education	120-290	-.16*	-.15*	.28*	-	-.20**
Mother's Occupation	137-333	-	-	-	-	-
Family Income	108-272	-.14	-.13	.27*	-.13	-.23**
Per Person Income	106-270	-	-.18*	.30**	-.11	-.20*
Number of People	148-360	-	.13*	-	-	.09
Number of Parents	141-339	-	-	.13	-	-.11
Sex	151-369	-	-.20**	-	-	-.11
Ethnicity	151-371	-	-	.28**	.15*	-
Attendance '72	146-340	-.18*	-	-	-.16*	-.11
Attendance '73	147-344	-.19**	-	-	-.14*	-.11
Attendance '76	143-342	-.16*	-.19**	-.12	-.18**	-.19**
Attendance '79	146-346	-.23**	-.31**	-	-.25**	-.26**
Attendance '82	146-323	-.34**	-.20**	.24*	-.48**	-.40**
Iowa - Gr. 3	126-274	-.28**	-.37**	.44**	-.11	-.42**
Iowa - Gr. 5	126-263	-.29**	-.35**	.46**	-.16*	-.44**
Iowa - Gr. 7	138-266	-.18*	-.30**	.53**	-	-.45**
California - Gr. 11[b]	135-159	N/A	-.24*	.58**	-.14	-.52**
Retention by '83	332-337		.20**	N/A	.30**	.54**
High Special Education	348-352				.23**	.51**
GPA	151				-.15	-.87**
Bad Withdrawal	365					.52**

a. 0=No, 1=Yes
b. Only for students on grade level
c. 1=Excellent to 7=Serious Problems

(no star) $p < .05$
* $p < .01$
** $p < .001$

percent of the students had been retained, 29 percent had been in Level 4 or more special education, and 23 percent had withdrawn from school under negative circumstances.

Three demographic variables--mother's education, family income, and per person income--were related to the outcomes in secondary school. They were most strongly related to GPA (r's of .27 to .30) and the rank measure (r's of -.20 to -.23). Sex was related to special education (-.20, males had more special education) and very weakly to the rank variable (-.11, males had a less favorable rank). Ethnicity was related to GPA (r=.28) and to leaving school under negative circumstances (r=.15). White students had higher GPA's and were more likely to have left school under negative circumstances.

Attendance in kindergarten and first grade was weakly related to being retained, leaving school, and the overall rank. Fourth grade attendance was related to all of these as well as to high level special education. Attendance became progressively more related to the four outcome measures through Grade 7 and 10. Students with problems attended school less in Grade 7, and the relationship between problems and attendance was even stronger for them three years later.

Test scores at all time points were related to having problems in secondary school. The Grade 3 Iowa scores were related to retention (r=-.28) and special education placement (r=-.37). Grade 3 performance was most strongly related to GPA; the correlation between the third grade scores and grade point average after Grade 11 was a hefty .44. The relationship between Grade 11 scores and GPA was only slightly higher at .58. Overall, the test scores were best at predicting GPA and rank (of which GPA was a component) and least effective in predicting retention and negative withdrawal.

At the bottom of Table 4.5 are the correlations among the outcome measures. The rank measure is highly related to all of the others because they were all taken into account in assigning students a rank. The relationship between negative withdrawal and the three other outcomes of retention, special education, and GPA demonstrates that the Head Start graduates who were most likely to leave school under negative circumstances were those who had had a history of problems.

A regression analysis was performed on retention by 1983. Possible independent measures were the demographic variables, sex, ethnicity, attendance at all time points, and the test scores through Grade 5. Only two variables, test scores at Grade 5 and attendance in 1982, were significantly related to retention. They accounted for 19 percent of the variance (N=92).

The same regression was performed using high level special education as the dependent measure. Test scores at Grade 5 and ethnicity together accounted for 15 percent of the variance (N=103). With performance on the Grade 5 tests controlled, the white students were more likely to have been in high level special education.

The regression analysis on GPA included the same set of independent measure with two exceptions: The Grade 7 scores were included, and attendance in Grade 10 was excluded. Attendance at Grade 10 contributed so highly and

directly to GPA that it could not really be considered an independent variable. Test performance at Grade 7 which accounted for 37 percent of the variance emerged as the only significant predictor of GPA (N=52). This is not to say that the other factors were not related but rather that they were operating through the Grade 7 scores. The other variables such as the demographics and the earlier test scores predicted the Grade 7 scores which in turn predicted GPA.

The regression on withdrawal under negative circumstances included the same set of dependent measures; however, attendance in '82 was excluded (many of the students were gone by then), as were the test scores at Grade 7 and 11. To have included additional test scores would have eliminated many of the special education students from the analysis. Test scores at Grade 5 and ethnicity were the best predictors. Together they accounted for 13 percent of the variance (N=119). With scores at Grade 5 controlled, the white students were more likely to have withdrawn from school under negative circumstances. (The same relationship was seen above with the simple correlation.)

The ranking variable was the best overall measure of performance in that it encompassed a variety of possible outcomes and put them all on the same measure. The regression analysis on rank included the demographic variables, sex, ethnicity, attendance through 1979, and test scores at Grades 3 and 5. The best predictors of rank were the test scores at Grade 5 and mother's education. Together they accounted for 28 percent of the variance.

DISCUSSION

Ideally, the data on factors related to outcomes could be quantitatively linked to develop a model of the processes operating at earlier points in time on these students. While the data are theoretically suited to such an analysis, several problems such as the amount of missing data and the fact that missing data were systematically related to outcomes (e.g., special education students didn't have test scores) made model building difficult. What could be done was a qualitative perusal of the numbers to discern themes which might suggest important relationships between variables.

An examination of the multitude of outcomes presented in this chapter highlights two conclusions about performance on standardized tests for the Head Start graduates of 1971. First, test scores were related to later outcomes. In measure after measure, test scores emerged as one of the best predictors. On the other hand, a number of other factors not examined in these analyses also contributed since the total percentage of variance explained was generally small. Second, the student's ultimate performance was suggested by the results of tests taken very early in the student's educational career. The fact that the Grade 3 Composite on the Iowa could by itself account for nearly 20 percent of the variance in high school GPA emphasizes that the students' paths were laid very early. It was, of course, the recognition of the importance of early achievement which resulted in the creation of the Head Start Program in the first place.

Another theme which emerged across a number of the outcome measures is the importance of the family background characteristics. Family income and

mother's education in particular were shown to be important predictors of later achievement. While this is consistent with a large body of educational research, it is somewhat surprising given that the Head Start students were a low-income population whose mothers had a relatively low level of education, particularly in comparison to the rest of the MCPS population. The lack of variability on the family income and mother's education measures operated against finding a relationship between them and later achievement. That a relationship existed at all is testimony to the importance of these factors to student achievement. The relationship for the entire MCPS population would also certainly be much stronger.

The answer to the question of whether there were differential outcomes for male and female Head Start graduates appears to be that there were, but these differences were small and they operated primarily through performance on achievement tests. The girls outscored the boys ever so slightly (although the difference got bigger with each successive round of testing). For males and females with identical achievement test scores, there were no differences.

The answer to the question of differences between blacks and whites is more complex. Ethnicity was clearly and consistently related to performance on standardized tests, and the black students had lower scores. However, for the Grade 3 scores, controlling for income eliminated this difference (i.e., the difference in scores was better described as being due to a difference in family income rahter than as being due to a difference in race). For the Grade 11 scores, the opposite phenomenon occurred: With both the Grade 7 and the Grade 5 scores controlled, ethnicity was significantly related to the Grade 11 scores. This suggests that the ethnicity difference like the sex difference may be getting bigger as time goes on. An alternative explanation is that the difference is really due to family income; but by Grade 11, the family income measure is twelve years old. A more up-to-date measure might have accounted for the differences.

Ethnicity was also related to type of courses taken and grade point average, with black students having taken more remedial courses and receiving lower grades. It was also predictive of leaving school under negative circumstances; however, it was the white students who most often left school.

In sum, ethnicity did appear to be related to outcomes within the Head Start population. It was also shown that the effect of ethnicity cannot safely be separated from the effect of income on student achievement by looking at the Head Start population. Even within the Head Start population, family income was related to achievement.

CHAPTER 5

CONCLUSIONS - PART 1

Part 1 of the study addressed the following two questions about the Head Start graduates:

1. Does participating in Head Start have any long-term effects?

2. What predicts outcomes for high school students who have graduated from the MCPS Head Start Program?

This chapter summarizes the findings from Chapters 3 and 4 and discusses their implications.

LONG-TERM EFFECTS OF HEAD START PARTICIPATION

The long-term effect of Head Start participation was examined by comparing the performance of the Head Start graduates with that of another group of students who applied for Head Start but did not attend. Table 5.1 presents the results for most of the measures for the three years of Head Start examined in the study.

The overall pattern of the findings indicated that the students who had attended Head Start in 1970-71 did much better than the comparison group who had not attended. Statistically significant differences were found for the Head Start class of 1970-71 on the following measures[1]:

- Grade 3 Iowa Test of Basic Skills
- Grade 5 Cognitive Abilities Test
- Grade 5 Iowa Test of Basic Skills
- Grade 7 Cognitive Abilities Test
- Grade 11 California Achievement Tests
- Percentage of students retained by 1981-82 (34% Head Start vs. 55% comparison group)
- Percentage of students in honors courses in Grade 11
- Average percentage of courses with A's and B's in 1981-82 (28% for Head Start vs. 17% for the comparison group)
- Average percentage of courses with low grades in 1981-82 (42% for Head Start vs. 57% for the comparison group)
- Percentage of students with an overall ranking of Average or above (30% Head Start vs. 19% comparison group)
- Composite measure, i.e., retained by Grade 12, in high level special education between Grades 8 and 12, or scored below the 40th percentile on the Grade 11 California Achievement Tests (67% Head Start vs. 99% comparison)

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1. All data were adjusted for demographic differences between the two groups.

TABLE 5.1

Numerically and Statistically Significant
Differences for Each Cohort

Measure	Cohort 1970-71 Num. Diff.[a]	1970-71 Stat. Signif.[b]	1974-75 Num. Diff.	1974-75 Stat. Signif.	1978-79 Num. Diff.	1978-79 Stat. Signif.
Achievement Tests[c]						
Average						
Grade 3	H	N	-	-	H	N
Grade 5	H	N	S	N	-	-
Grade 7/8	H	N	S	N	-	-
Grade 11	H	Y	-	-	-	-
% High Scorers						
Grade 3	H	Y	-	-	H	N
Grade 5	H	Y	C	N	-	-
Grade 7/8	H	Y	C	N	-	-
Grade 11	H	N	-	-	-	-
% Low Scorers						
Grade 3	H	N	-	-	S	N
Grade 5	H	N	H	Y	-	-
Grade 7/8	H	N	H	N	-	-
Grade 11	H	Y	-	-	-	-
Retention						
By Grade 4	H	N	-	-	S	N
By Grade 8	H	N	S	N	-	-
By Grade 11	H	N	-	-	-	-
Special Education						
Grade 4	C	N	-	-	S	N
Grade 8	C	N	S	N	-	-
Grade 11	C	N	-	-	-	-

Note: Data were not available on all mesures for every cohort and grade level.

a. Numerical difference favored: H = Head Start Group
C = Comparison Group
S = Same, i.e., difference did not exceed two points on a hundred point scale

b. Difference between the Head Start and comparison group was statistically significant: Y=Yes N=No

c. Test scores from Grade 8 were used for the 1974-75 cohort.

TABLE 5.1 (cont.)

Measure	Cohort 1970-71 Num. Diff.[a]	1970-71 Stat. Signif.[b]	1974-75 Num. Diff.	1974-75 Stat. Signif.	1978-79 Num. Diff.	1978-79 Stat. Signif.
Composite Measure						
Grade 4	-	-	-	-	S	N
Grade 8	-	-	H	N	-	-
Grade 12	H	Y	-	-	-	-
Attendance						
Grade 4	S	N	-	-	-	-
Grade 7	S	N	-	-	-	-
Grade 10	H	N	-	-	-	-
Special Help						
Grade 10	H	N	-	-	-	-
Course Selection						
Advanced Courses						
Grade 10	S	N	-	-	-	-
Grade 11	H	Y	-	-	-	-
Remedial Courses						
Grade 10	H	N	-	-	-	-
Grade 11	H	N	-	-	-	-
Grades						
A & B's						
1980-81	H	N	-	-	-	-
1981-82	H	Y	-	-	-	-
Low Grades						
1980-81	H	N	-	-	-	-
1981-82	H	Y	-	-	-	-
GPA	H	N	-	-	-	-
Questionable Withdrawals	H	N	-	-	-	-
Rank						
Average	H	N	-	-	-	-
% above "Average"	H	Y	-	-	-	-

Note: Data were not available on all mesures for every cohort and grade level.

a. Numerical difference favored: H = Head Start Group
C = Comparison Group
S = Same, i.e., difference did not exceed two points on a hundred point scale

b. Difference between the Head Start and comparison group was statistically significant: Y=Yes N=No

Of the 35 measures, 10 showed statistically significant differences between the two groups; and on all 10, the Head Start students exhibited superior performance. On another 19 of the measures, there were numerical differences which favored Head Start. The comparison group was favored on only three; and on another three, the outcomes were the same. "Same" was defined as a difference of less than three points on a 100-point scale. When the figures were corrected for demographic differences, the students who had attended Head Start in 1970-71 were superior on a number of indicators to those who had applied but did not attend.

The findings from the fourth and eighth graders (the Head Start classes of 1974-75 and 1978-79, respectively) hinted at the possibility of a positive effect for Head Start, but the evidence was weak. The only statistically significant difference for the 1974-75 group was the percentage of students below the 40th percentile on the fifth grade California Achievement Tests (33% Head Start to 48% comparison group). For the 1978-79 group, the only statistically significant difference was the percentage of students above the 80th percentile on the Verbal subtest of the Grade 3 Cognitive Abilities Test (not shown in Table 5.1). This Head Start group also had a larger percentage of high scorers on the other two subtests and the Total score on the California Achievement Tests and a higher mean score on all subtests of both tests, but these differences were not statistically significant. For all three years of Head Start graduates, there were a number of measures which favored the Head Start group; but the differences were not statistically significant. There was not a single measure for any of the three Head Start cohorts with a statistically significant difference which favored the comparison group.

An examination of the demographic data for the Head Start and comparison students showed there were important differences between these two groups; for example, the comparison families had higher incomes and higher levels of education. The two groups being compared, therefore, were not truly equivalent. Given the direction of the demographic differences, one would expect the comparison students to do better over the long term. Because of this, analysis of covariance was used to control statistically for the demographic differences in an attempt to make the two groups more equivalent. The capability of this statistical technique to correct for pre-existing differences in this kind of a study is unknown. To the extent that the analysis did not correct for all the differences, the design of the study was biased <u>against</u> finding an effect for Head Start participation. The fact that a difference was found which favored the 1970-71 Head Start group, given the less than ideal comparison group, speaks to the strength of the effect of Head Start participation. The failure to find an effect for Head Start participation with the other two cohorts could be due to the inability of the design to detect smaller effects rather than the true absence of an effect.

The study was also limited in that it looked only at the effect of Head Start participation as reflected in a student's school performance. Head Start is a multifaceted program; and the impacts on other program areas, such as social competence, health, nutrition, and the family, were not measured directly. To the extent these are not reflected in the student's later school performance, they were not measured by the study.

It is somewhat puzzling that the findings for the two younger groups do not mirror those for the oldest students. One possible explanation is that a number of the comparison children from these years were in some kind of good alternative arrangements, such as high-quality day care, and thus may have received experiences much like being in a Head Start classroom. Another possible explanation is that the program changed (for the worse) between 1970 and 1974. A third possibility is that the differences between the groups do not emerge until high school. This last possibility is not supported by the data, however. The differences between the Head Start and comparison groups from 1970-71 were present throughout their school histories.

Before concluding that Head Start participation had a long-term positive effect, it is important to consider alternative explanations for the findings. One possible explanation is that the Head Start and comparison groups from 1970-71 were initially different in a way that did not correlate with demographics. For example, one possibility is that the comparison group just happened to consist of a large number of students with limited ability. These students were responsible for the differences between the groups, and the results did not have anything to do with Head Start participation. While there is no way of discounting this explanation, it seems more likely that Head Start rather than a fluke of distribution was responsible for the eventual differences in outcomes between the two groups.

It would be most helpful if the study could provide some information about the process by which Head Start enabled students to perform better so many years later. Unfortunately, there is no objective information as to what went on in MCPS Head Start classes in 1970-71 or either of the other years.[2] Given the pattern of the data, it appears that Head Start had its effect by reaching some children and enabling them to do possibly much better than they would have done without Head Start. It did not appear that Head Start had a long-term effect on all of the participants since a large proportion of them went on to experience very serious academic difficulties. The difference between the Head Start and comparison groups could be due to a set of children and/or families who were "reachable." The ones who attended Head Start were reached and went on to make it academically. The same type of children in the comparison group did not get the help they needed (at the time they needed it?) and went on to do poorly.

FACTORS RELATED TO LATER PERFORMANCE

Analyses were performed to examine the relationship between outcomes in secondary school and possible predictors for Head Start graduates of 1970-71. The analyses looked at background characteristics, such as mother's education and family income and child characteristics, such as sex and race/ethnicity, attendance, and achievement as measured by the standardized tests. The relationships between background factors and outcomes were

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2. Speculation about the process by which early intervention works has been provided in some other recent research. See, for example, Lazar, et al. (1982) and Berreuta-Clement, et al. (1984).

strongest for mother's education and income. Within the Head Start population, the students whose mothers had the higher levels of education and whose families had the higher income levels at the time of application to Head Start tended to have better performance in secondary school. Ethnicity and sex were also predictive. Test performance at Grades 3 and 5 was often among the strongest of any of the predictors. In fact, test performance at these grades was nearly as good at predicting later outcomes as scores on tests taken at a much later time point.

From the standpoint of explaining racial/ethnic differences in performance among Head Start students, the type of data available (i.e., family income data) provided an opportunity to examine statistically how much of the difference between the black and white students was a reflection of income differences. Regression analyses showed that there were some outcome measures where the apparent racial/ethnic differences were totally due to differences in family income. There were other measures where even with income controlled, there were still differences with regard to racial/ethnic group membership which could not be explained. The relationship between family income, racial/ethnicity group membership, and student performance is a complex issue which can only be studied adequately with a sample representing a broader range of income levels than those found among Head Start families.

Several cautions need to be considered with regard to interpreting these findings. The first caution applies to the predictor-outcome findings as well as to the findings of racial/ethnic group differences which will be presented in Part 2. The findings are descriptions of a situation; they provide no insight as to the causal factors that led to that situation. For example, the finding that sex is related to academic achievement and that males experience more school problems than females is consistent with <u>all</u> of the following hypotheses:

- Males are genetically inferior to females.
- Teachers are biased against males.
- Males display more aggressive behavior in the classroom which results in their being singled out as problem students more often.
- Males are less interested in sedentary activities such as reading which means they spend less time on task and ultimately learn less.

One last caution is that the relationships between predictors and outcomes are generalizations, and generalizations do not describe the situation for every single person studied. There were Head Start graduates who did extremely well, and the data from this study should in no way be construed to imply that "all children from low-income families", or "all Head Start graduates," or "all black males," or all of any category of students have a predetermined future.

IMPLICATIONS

The design of the MCPS follow-up study of Head Start graduates was modeled after several recent studies of the long-term effects of early education for children from low-income families, and the MCPS findings are consistent with the findings from this research (Consortium for Longitudinal Studies, 1983;

Berreuta-Clement, Schweinhart, Barnett, Epstein, and Weikart, 1984). In the past, studies in this area had followed children only through third grade. These studies generally found a positive effect shortly after program participation; but by Grade 3, there were no longer any differences between children who had participated in a program and those who had not (Horowitz and Paden, 1973). The newer studies followed the children well beyond Grade 3 and looked at more global indicators of school performance, such as retention and placement in special education, in addition to the traditional measures such as test performance. The more recent work in the area has concluded that early childhood education does have a positive impact on school performance which lasts for many years.

Although the findings from this study were not entirely consistent from cohort to cohort, the pattern of results suggests that participation in the Head Start Program has long-term positive effects; and, thus, Head Start represents a way to improve the achievement of children from low-income families in MCPS.

The relationship between family background characteristics and school performance also has been repeatedly shown in other studies (see Deutsch, 1973, for an extended discussion). The power of early achievement to predict later achievement is also a commonplace finding (Bloom, 1964). Both of these findings served as part of the theoretical basis for the initiation of the Head Start Program by the federal government nearly 20 years ago (Zigler and Anderson, 1979). Their implications for educational practice are as important now as they were then. They suggest that some students are going to need more help than others to attain the same level of achievement. They also suggest that the earlier help is delivered, the better the student's chances are for success at a later point.

PART 2

PERFORMANCE OF A LOW-INCOME POPULATION IN MCPS

CHAPTER 6

PERFORMANCE OF LOW-INCOME STUDENTS IN MCPS

SUMMARY

Performance of the 1970, 1974, and 1978 years of Head Start graduates was examined and compared, when possible, with that of other MCPS students who were born in the same year. A ranking measure which incorporated a number of aspects of the student's school history classified 40 percent of the Head Start students born in 1966 as having serious problems. All three years of Head Start graduates were substantially below the other MCPS students on the latest administration of the California Achievement Tests (CAT). About twice as many of the Head Start sample had been retained, three to four times as many had been in special education, and three to five times as many had low Total scores on the CAT. Based on the composite measure, three-fourths of the Head Start sample born in 1966 and over half of those from the other two years had experienced academic difficulty. Three-fourths of the Head Start sample were below average on the ranking measure. Of the three samples of Head Start graduates, the oldest group had the highest percentage of students with problems regardless of the measure examined.

Data on several measures are presented in this chapter to provide a picture of how low-income students, as represented by the Head Start population, have fared in the Montgomery County Public Schools. For most of the measures, comparable data are presented for all of the other students in MCPS who were born in the same year as those in the Head Start sample to provide a benchmark for interpreting the Head Start figures.[1]

RANKINGS OF THE HEAD START GRADUATES BORN IN 1966

The most comprehensive measure of performance for the Head Start graduates born in 1966 was the ranking measure described in Chapter 3. This measure is the most inclusive of all of the measures examined because it takes into account such factors as withdrawal from school under negative circumstances, the intensity of services students have required, and actual school performance as measured by grades. The scale had seven points with "1" meaning "Excellent" and "7" meaning "Serious Problems." Characteristics of students given a ranking of 1, 4, or 7 were presented in Table 3.14. To reiterate, a student with "Serious Problems" had one of the following: a very low GPA and at least four basic courses, one retention and low grades, three years of special education placement in a special school, at least one year in a special school and one retention, two years retention, or a withdrawal from school under negative circumstances. Unfortunately, there are no comparable rankings available for the other MCPS students because the ranking system included the student's entire school history which was only

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1. The number of Head Start students included in the analyses in this chapter are greater than in Chapter 3 and Appendices D and E because the students missing demographic data were excluded from those analyses.

available through the review of the records, not the computerized pupil data base.

The percentage of the Head Start sample from 1966 who received each ranking is shown in Figure 6.1. The largest percentage of students, 40 percent, were classified as having serious problems. It is already known that half of these were students who left school; however, as data presented in Chapter 4 show, there was a rather high relationship between having academic problems and leaving school under negative circumstances. Many of the students who dropped out would have been classified as "Serious Problems" even if they had stayed in school. In addition to the 40 percent with serious problems, another 34 percent were classified as poor or low average.

PERFORMANCE ON STANDARDIZED TESTS

The most recent performance of each of the three years of Head Start graduates on the CAT is presented in Table 6.1. The comparable data for the other MCPS students are also presented. The test scores are in NCEs (Normal Curve Equivalents). As discussed in Chapter 3, NCEs have a mean of 50 and a standard deviation of 21. The average NCE score on the Total Reading, Total Language, Total Mathematics, and Total Battery are graphed in Figure 6.2. Figure 6.3 presents the distributions for the Total score for each of the three cohorts.

For the students born in 1966, those in the Head Start sample had an average Total score of 42 which was below the national average (NCE=50) and well below the average for the other MCPS students which was 66. An NCE of 42 corresponds to the 35th percentile while a 66 corresponds to the 78th. For the other two groups of Head Start students, their score on the Total Battery was slightly above the national average but well below the average for the other MCPS students. As can be seen in Figure 6.2, the relationship between the Head Start graduates and the other MCPS students was fairly consistent from test area to test area for the Head Start students born in 1970 and 1974; the Head Start sample from 1966 had lower scores than the other two years on all areas of the test. The distributions of the Total scores (see Figure 6.3) clearly illustrate the lower performance of the Head Start sample. It also shows, however, that there were, for each cohort, some Head Start students who had very high achievement levels as measured by the CAT. While low achievement characterized the Head Start sample as a group, it did not characterize the performance of every individual within the group.

PERFORMANCE ON THE OUTCOME MEASURES

The outcome measures, which were determined from the information on the pupil data base and the computer tapes of the testing results, were the following:

- Not in an age-appropriate grade placement
- Placement in Level 4 or more special education during the preceding four years

Figure 6.1
High School Rankings of
Head Start Students Born in 1966

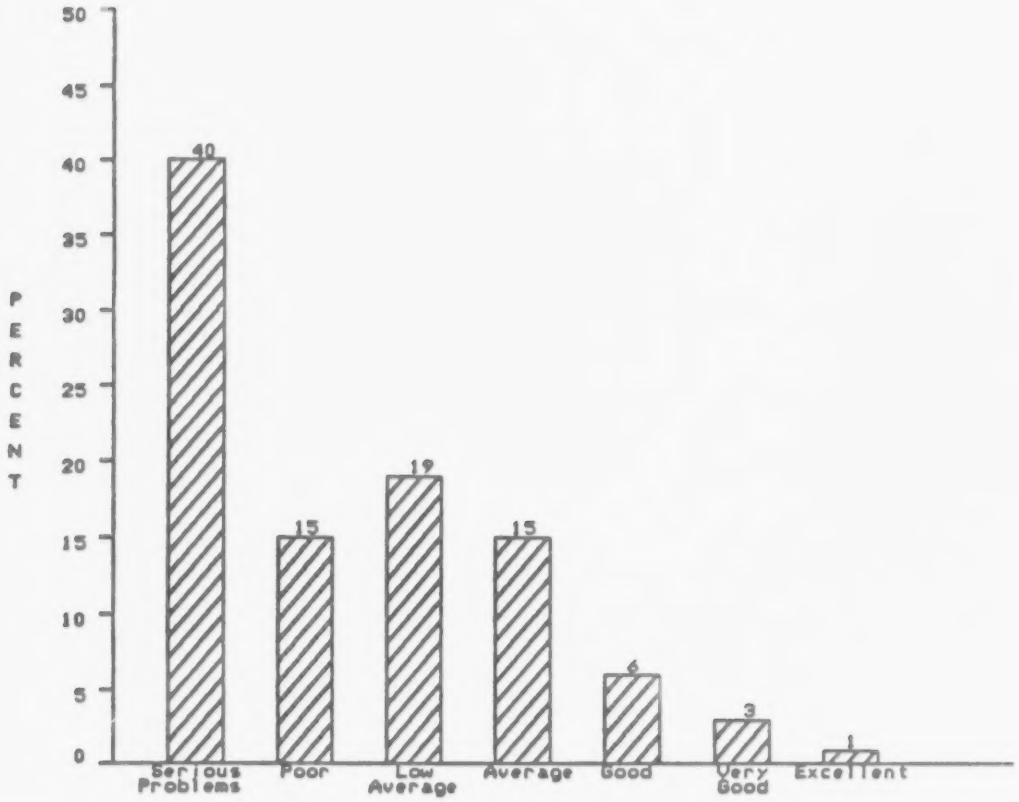


TABLE 6.1

Average NCEs on Most Recent California Achievement Tests
for Students Born in 1966, 1970, and 1974

	Born in 1966[a]		Born in 1970[b]		Born in 1974[c]	
	Head Start	Other MCPS	Head Start	Other MCPS	Head Start	Other MCPS
N =	140	5741	311	5581	298	4957
Phonics Analysis	-	-	-	-	50	58
Structural Analysis	-	-	-	-	56	63
Reading Vocabulary	41	64	49	67	51	63
Reading Comprehension	42	65	52	68	54	63
TOTAL READING	41	65	51	68	52	64
Spelling	43	60	51	62	53	61
Language Mechanics	43	64	55	69	60	69
Language Expression	42	64	52	65	54	64
TOTAL LANGUAGE	42	65	53	68	58	68
Math Computation	45	63	55	67	55	67
Math Concepts and Applications	44	66	56	71	55	65
TOTAL MATHEMATICS	44	65	56	70	59	67
Reference Material	47	65	54	68	-	-
TOTAL BATTERY	42	66	53	70	55	68

Note:

NCE	=	Percentile
40		32
50		50
60		68
70		83

a. Administered Grade 11
b. Administered Grade 8
c. Administered Grade 3

Figure 6.2
Average Scores on the
California Achievement Test for
Students Born in 1966, 1970 and 1974

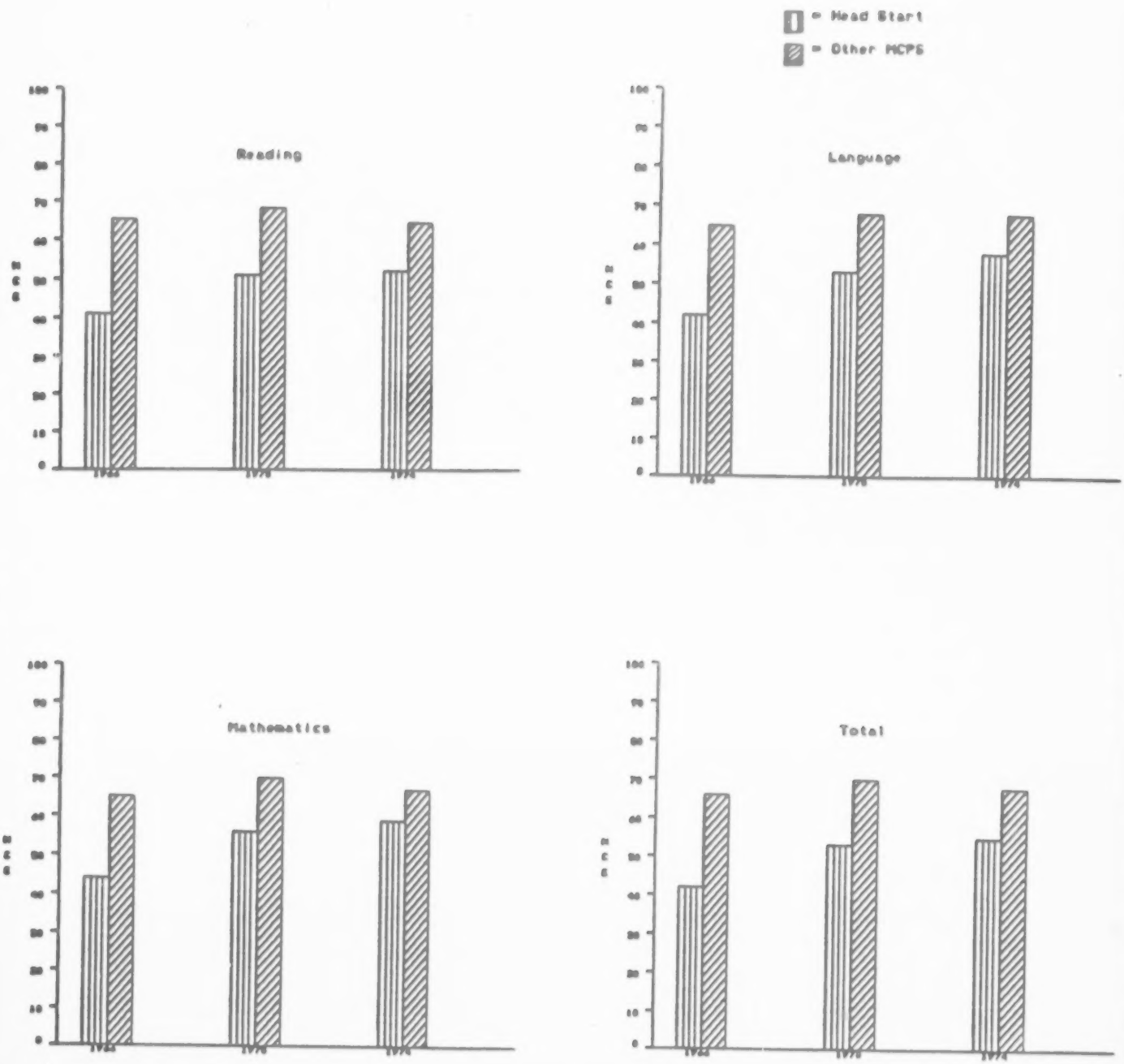


Figure 6.3a
Score Distribution for Total on the
California Achievement Test

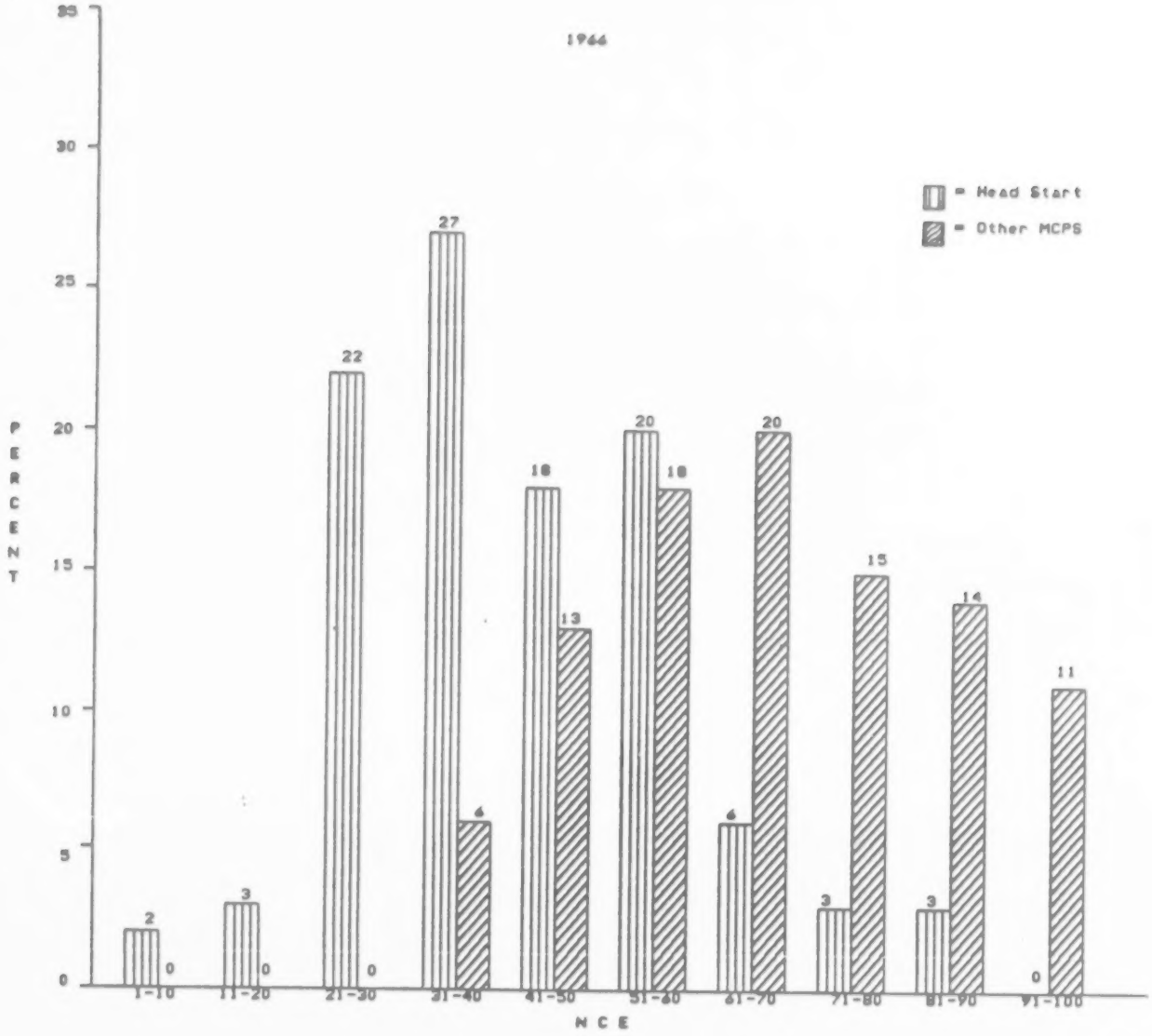
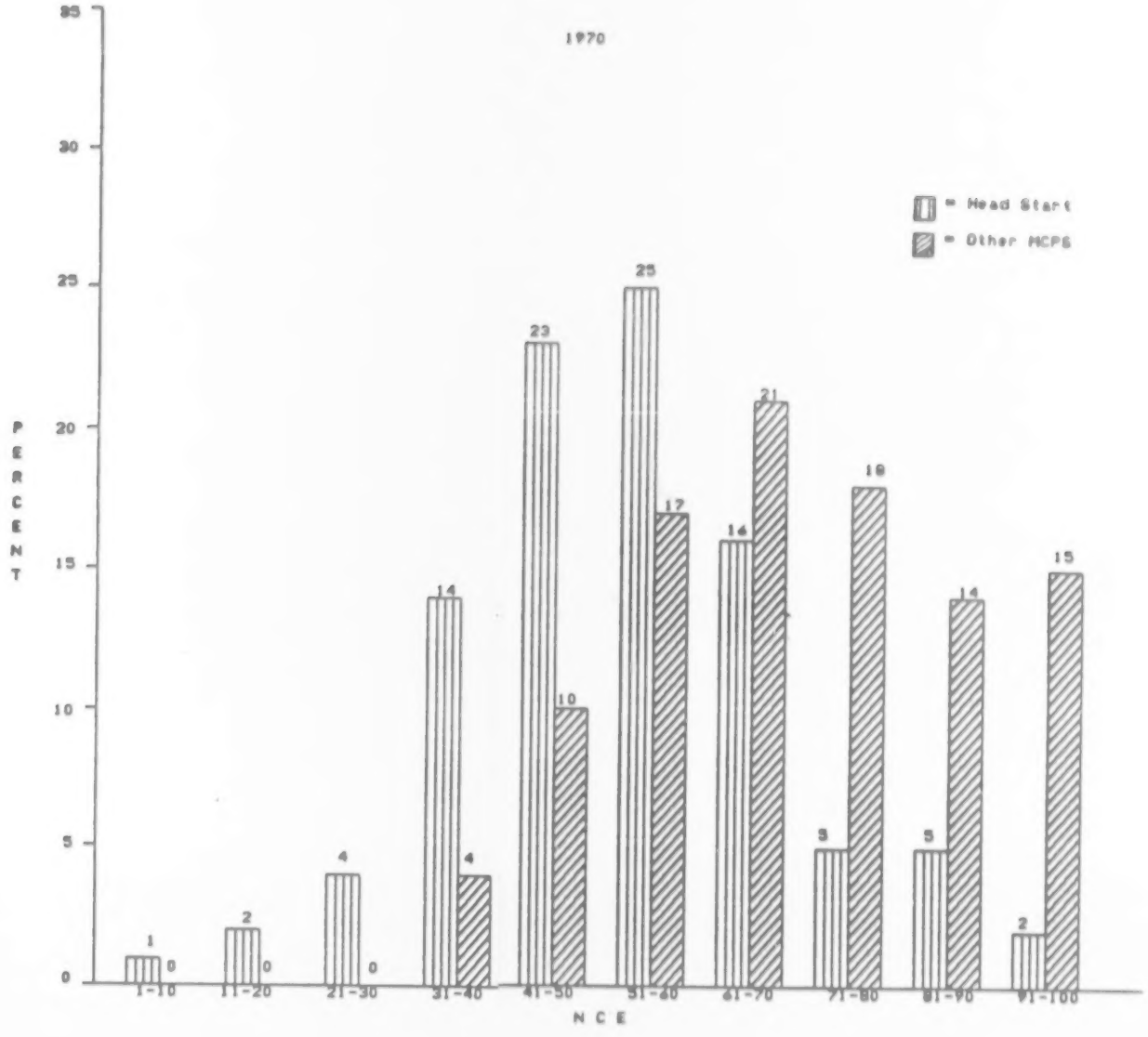


Figure 6.3b


1970
= Head Start
= Other MCPS
PERCENT
NCE
1-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
0
5
10
15
20
25
30
35
1
0
2
0
4
0
14
4
23
10
25
17
14
21
5
18
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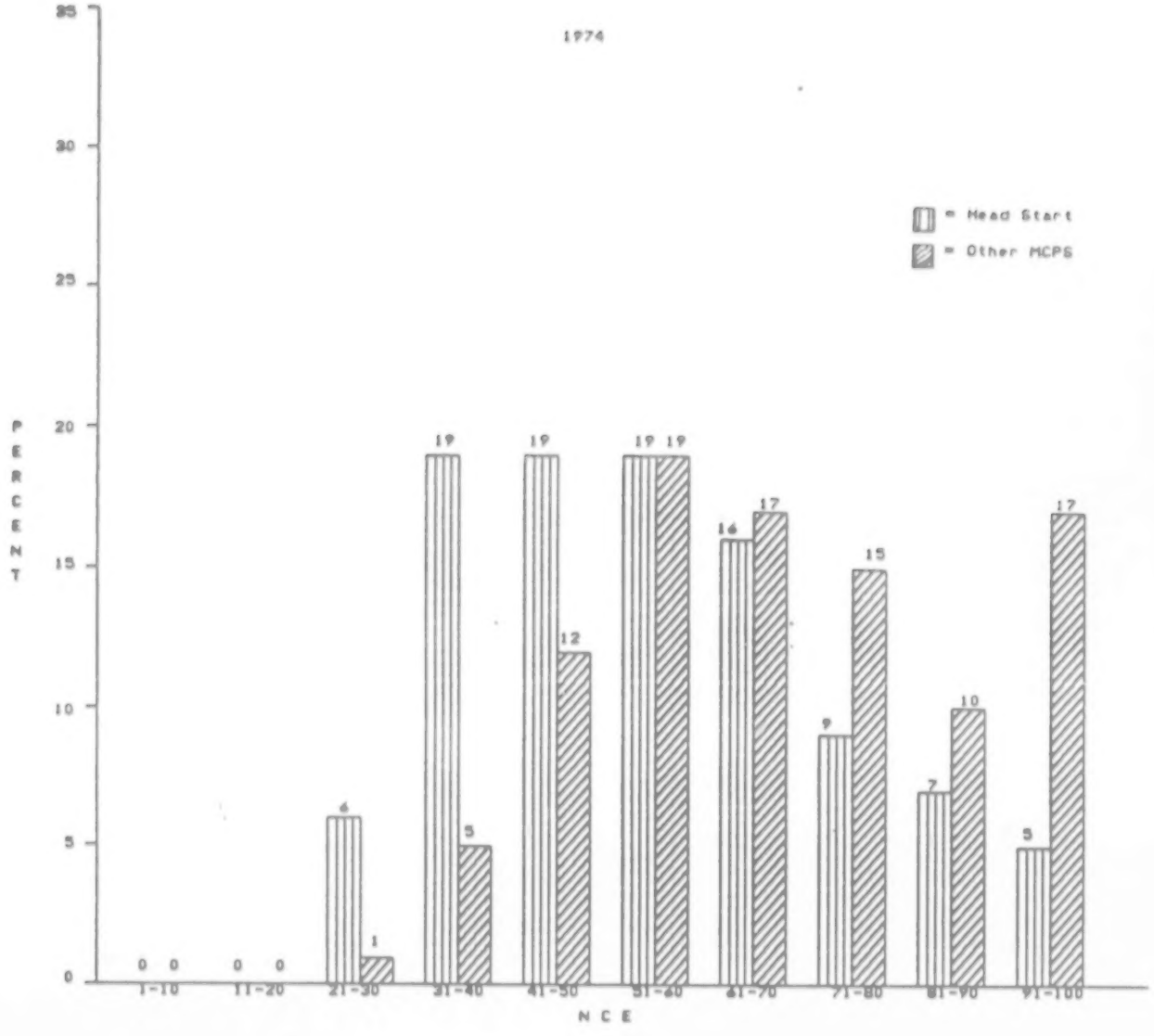
14
2
15

Figure 4.3b


1974
= Head Start
= Other MCPS
PERCENT
NCE
1-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
0 0
0 0
6
1
19
5
19
12
19 19
16
17
9
15
7
10
5
17

- A Total Score on the most recent administration of the CAT below the 40th percentile

- A composite measure which was a combination of the previous three

Only students who were continuously enrolled between 1980 and 1984 were included in the analysis. The first measure is somewhat ambiguous for the MCPS students who did not attend Head Start. Students were counted as "not in an age-appropriate grade placement" if their grade level as listed on the pupil data base was less than what it should be given their year of birth. For the Head Start sample, this is an indicator of retention because we know the year the students started in Head Start. For the other MCPS students, an inappropriate grade-for-age placement could mean the student entered kindergarten as a six year old or transferred from another school system or even another country and was placed in a grade level on the basis of a criterion other than age. Because historical grade level data are not maintained on the pupil data base, there is no way of knowing a student's grade level history from year to year. The implication is that the percentage of MCPS students reported as "not in an age-appropriate grade placement" is an overestimate of the extent of retention for this group and that the difference between the Head Start students and the other MCPS students with regard to retention is in reality greater than reported here.

The outcome data for the three years of students are presented in Table 6.2 and are graphed in Figure 6.4. For each year, proportionately about twice as many Head Start as other MCPS students were in an inappropriate grade-for-age placement. About three times as many of the Head Start sample had been in a Level 4 or more special education placement during the preceding four years for the students born in 1970 and 1974. The figure was closer to four times as many for the students born in 1966. For the CAT, the difference between the groups got progressively worse as the age of the students went up. For the students born in 1974, a little over three times as many of the Head Start sample as other MCPS students were low scorers. For the students born in 1970, the figure was very close to four times as many. For the students born in 1966, nearly five times as many of the Head Start sample as other MCPS students scored below the 40th percentile.

The data on the composite measure show that a large proportion of the Head Start sample had experienced some kind of academic problem. For the two younger Head Start samples, those born in 1970 and 1974, over half had either been retained, been in a high level special education placement, or had scored below the 40th percentile on the CAT by the time they were in eighth and fourth grade, respectively. The situation was even worse for the older Head Start sample. Three-fourths of them had had some kind of serious academic difficulty as measured by the composite measure. The comparable figure for the other MCPS students was roughly 25 percent for all three birth years.

TABLE 6.2

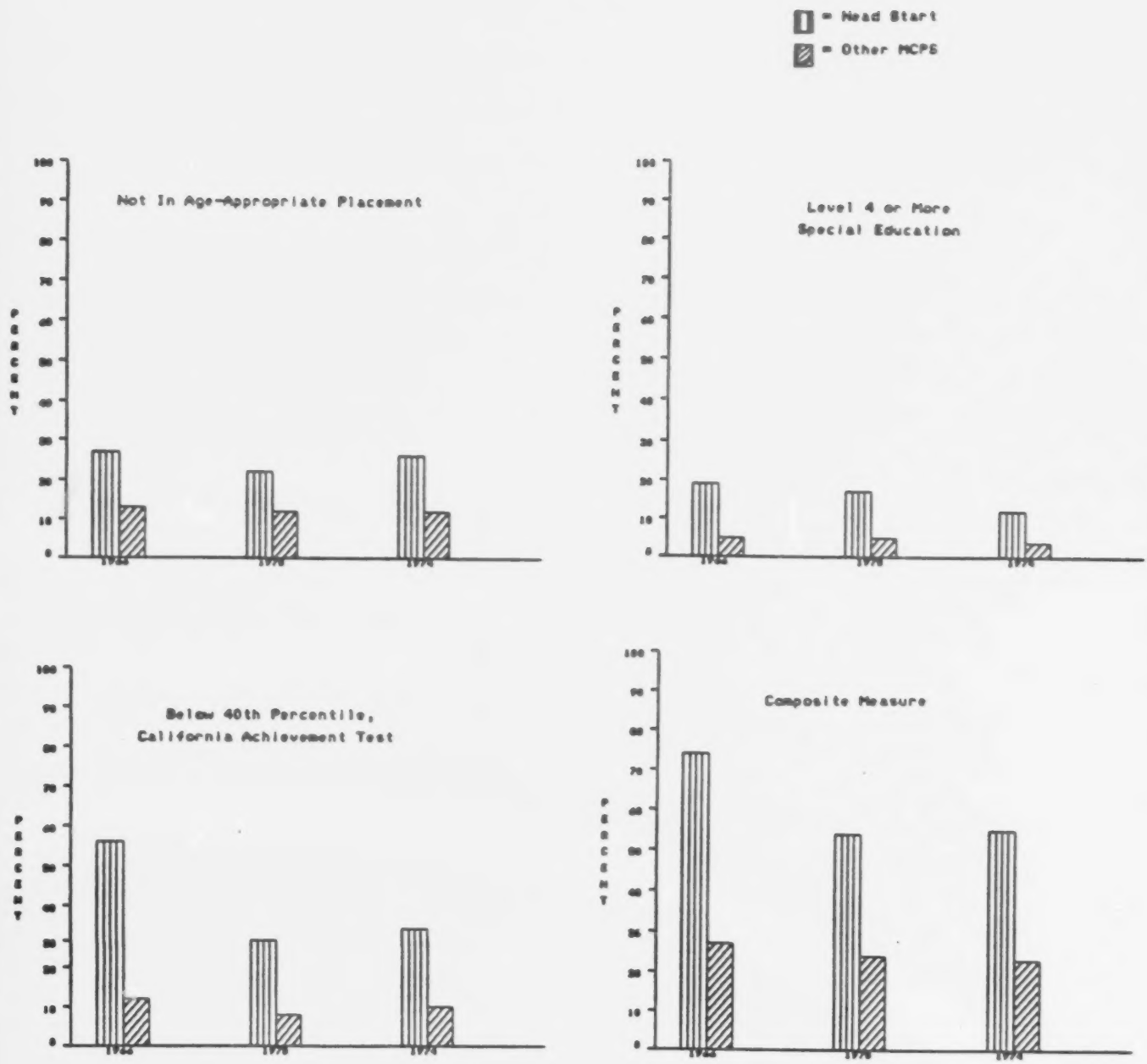
Outcomes for Students
Born in 1966, 1970, and 1974

	Born in 1966		Born in 1970		Born in 1974	
	Head Start %	Other MCPS %	Head Start %	Other MCPS %	Head Start %	Other MCPS %
Not in age-appropriate grade placement	27 (N=177)	13 (N=5913)	22 (N=388)	12 (N=5584)	26 (N=362)	12 (N=3682)
In Level 4 or more special education	19 (N=218)	5 (N=6168)	17 (N=460)	5 (N=5847)	12 (N=410)	4 (N=3841)
Below grade level or in Level 4 or more special education	41 (N=218)	17 (N=6168)	35 (N=460)	17 (N=5847)	34 (N=410)	15 (N=3841)
Below 40th percentile Total Battery, California Achievement Test[a]	56 (N=124)	12 (N=4885)	30 (N=293)	8 (N=4547)	34 (N=272)	10 (N=3199)
Below grade level or in Level 4 or more special education or below 40th percentile	74 (N=205)	27 (N=5869)	54 (N=437)	24 (N=5474)	55 (N=399)	23 (N=3723)

Note: Only students enrolled continuously for the last four years are included. Percentages were computed only on students who did not have missing data for a category, i.e., the number in parentheses below the percentage.

a. Born in 1966 - Administered in Grade 11
Born in 1970 - Administered in Grade 8
Born in 1974 - Administered in Grade 3

Figure 6.4
Outcomes for Students
Born in 1966, 1970 and 1974



CHAPTER 7

DIFFERENCES BY RACIAL/ETHNIC GROUP AND SEX

SUMMARY

The analysis of differential outcomes by racial/ethnic group and sex showed several things. First, with regard to the minority/majority student gap, the differences between the minority and majority students were less for the Head Start sample than for the other students in MCPS. In fact, within the Head Start sample, the Asian and Hispanic students generally had the same percentage or a smaller percentage of students with difficulty than the majority students. Although the black Head Start graduates had experienced proportionately more problems than the white Head Start graduates, the differences between these two groups were not as great as those for their counterparts within the rest of the MCPS population. Second, the analyses identified several groups of students as disproportionately represented on any of the measures of school difficulty. Males consistently had more school problems than females. A high percentage of black and Hispanic males, in particular, had problems, as did black females. Lastly, these analyses again emphasize the findings from the previous chapter about the poor performance of children from low-income families in MCPS.

MCPS has recently undertaken an effort to improve the achievement of minorities in the school system. Because of the concerns about minority achievement in the county, the data from this study were analyzed with respect to the student's racial/ethnic background. The purpose of this analysis was to examine the pattern of racial/ethnic group differences in the Head Start population compared to the pattern of differences among the other students in MCPS. Similar analyses were done to examine the differences in outcome for boys and girls from low-income families and for racial/ethnic membership and sex combined. The findings for the students born in 1966 are presented in this chapter along with a synthesis across all three birth years. The findings for the students born in 1970 and 1974 are presented in detail in Appendix F.

INTERPRETING THE FINDINGS

The follow-up data on graduates of the Head Start Program provided a unique opportunity to examine how children from low-income families but different racial/ethnic backgrounds have fared in the Montgomery County Public Schools. In the past, many of the analyses of racial/ethnic differences in countywide data have been difficult to interpret because the effect of racial/ethnic group could not be separated from the effect of family income on the measure being examined. Because the Head Start population is a low-income population, income is in some sense "controlled," allowing for an examination of race/ethnicity differences for students from families with similar income levels.

To verify that the income levels of the different ethnic groups were indeed similar, t-tests were used to compare the white Head Start families' income level to that of each of the three minority groups. These data are presented in Table 7.1 and graphed in Figure 7.1. While the family income

TABLE 7.1

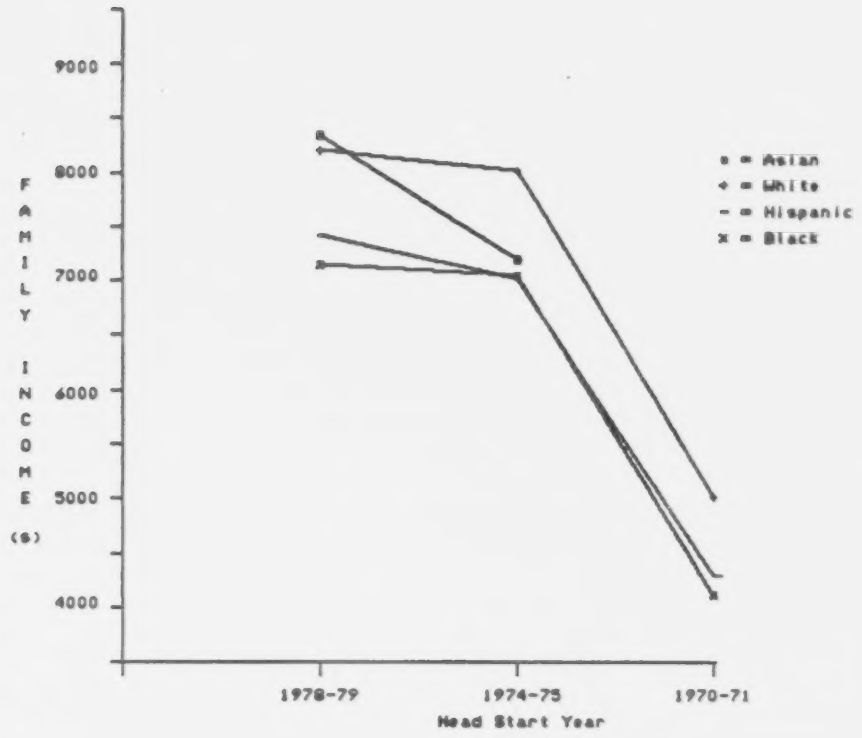
Mean Income by Race/Ethnic
Group Within the Head Start Population

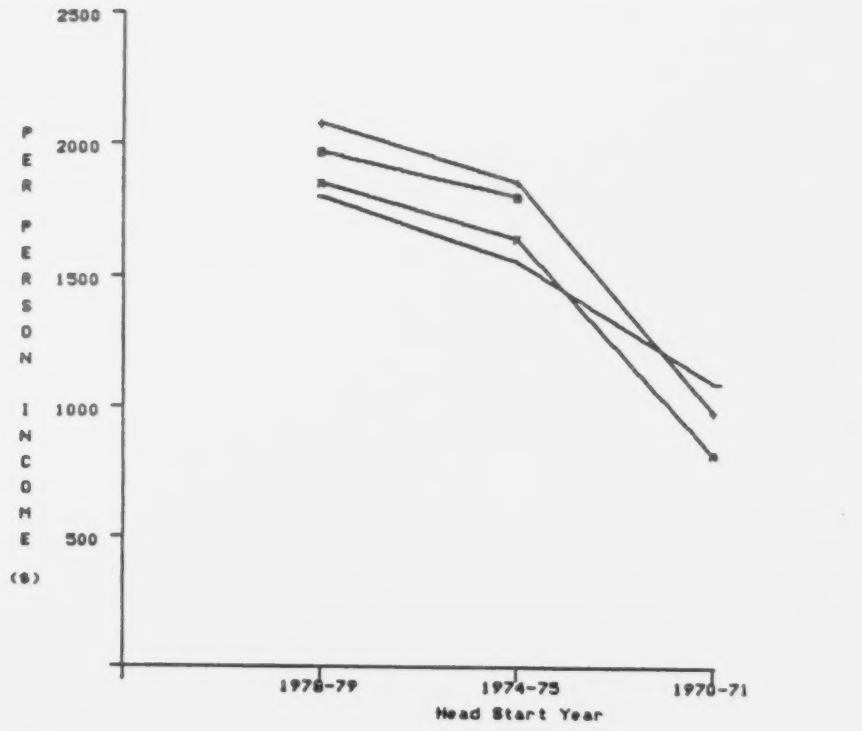
	Head Start Year 1978-79				1974-75				1970-71			
	N	Mean	Dev.	p[a]	N	Mean	Dev.	p	N	Mean	Dev.	p
Family Income												
White	302	8440	4103	-	453	8082	4411	-	137	5066	2361	-
Asian	38	8711	2903	n.s.	17	7412	3726	n.s	-	-	-	-
Black	171	7349	3689	**	280	7125	4737	**	141	4262	1992	**
Hispanic	44	7864	4027	n.s.	55	7073	3604	.06	11	4636	2111	n.s.
Per Person Income												
White	300	2078	1129	-	450	1861	1376	-	135	982	379	-
Asian	38	1970	860	n.s.	16	1800	885	n.s.	-	-	-	-
Black	168	1852	1127	*	276	1645	1264	*	141	821	621	.08
Hispanic	43	1800	942	n.s.	54	1561	706	**	11	1097	536	n.s.

a. Statistical significance when compared to the average for the white families.

* p <.05
** p <.01

Figure 7.1
Income by Ethnicity/Race
for Each Head Start Year





and per person incomes were similar across the racial/ethnic groups (especially relative to the rest of the MCPS population which, although unknown, was certainly much higher), there were also statistically significant differences. In particular, for all three Head Start cohorts, the white families had a higher family income and per person income than the black families. For the most part, there were no differences for the Asians and Hispanics in comparison to the white families.

As was seen in Chapter 4, family income predicted outcomes for Head Start students. Given this and given that the incomes differed as a function of racial/ethnic group membership leads to the conclusion that outcome data for Head Start students cannot be interpreted as due to racial/ethnic differences in the absence of income differences. While the income levels of the families are probably closer within the Head Start population than in the MCPS population in general, family income could still be responsible for some of the differences between the racial/ethnic groups who are Head Start graduates.

Furthermore, while we know that the different ethnic/racial groups within the Head Start group are from different yet similar economic backgrounds, nothing is known with any certainty about the family income of the other MCPS students. Minority status and family income may be even more confounded for these students.

The measures presented in this chapter are the four outcome measures discussed in Chapters 3 and 6. The findings are presented first by racial/ethnic group and then by sex. The outcome measures were also analyzed by race and sex simultaneously to identify any specific group of students (for example, Asian males) who had experienced a disproportionate number of problems. The results of the race/ethnic group by sex analyses are summarized rather than presented in detail because they were extremely lengthy.

FINDINGS FOR BIRTH YEAR 1966 (GRADE 12)

Differences by Racial/Ethnic Group

Table 7.2 presents the data for the four outcome measures for Head Start graduates and the other MCPS students who were born in 1966. The percentage under each racial/ethnic group refers to the percentage of that group in the category. The total number is the number of children on which that percentage was based. For example, looking at "Inappropriate Grade for Age Placement" for the Head Start sample, the table indicates that 29 percent of the 108 black Head Start graduates were below grade level in 1983-84. These data are graphed in Figure 7.2.

A measure of "racial difference" was computed by dividing the percentage of a given minority group who had experienced school difficulty by the percentage of majority (white, not Hispanic) students who had experienced that difficulty. For example, within the other MCPS group, 10 percent of the black students had been in special education compared to 5 percent of

TABLE 7.2

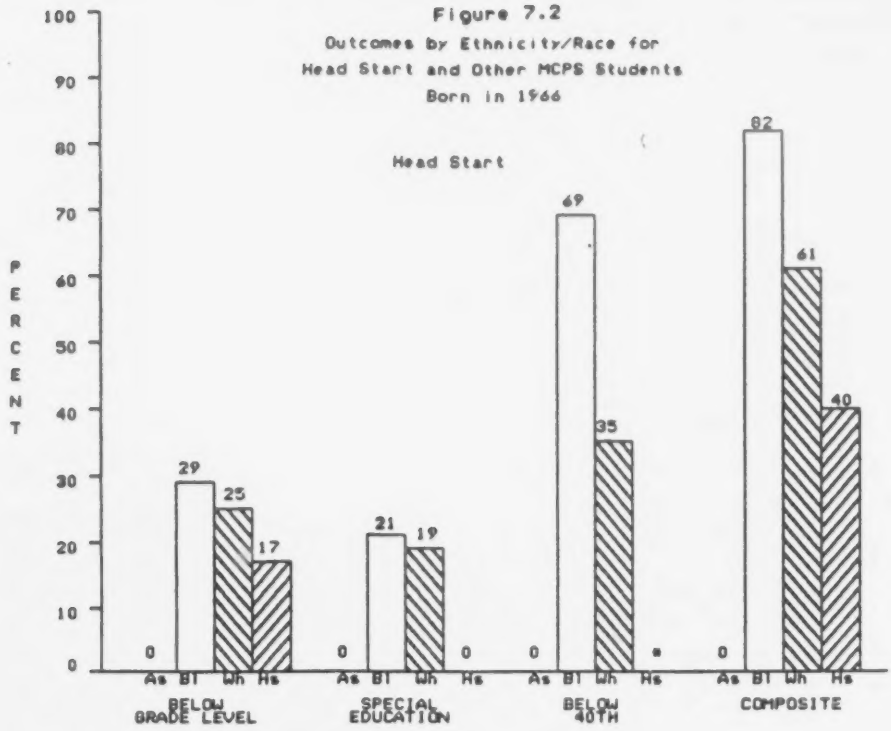
Outcomes by Ethnicity/Race for Head Start Sample (1970-71)
and Other MCPS Students Born in 1966

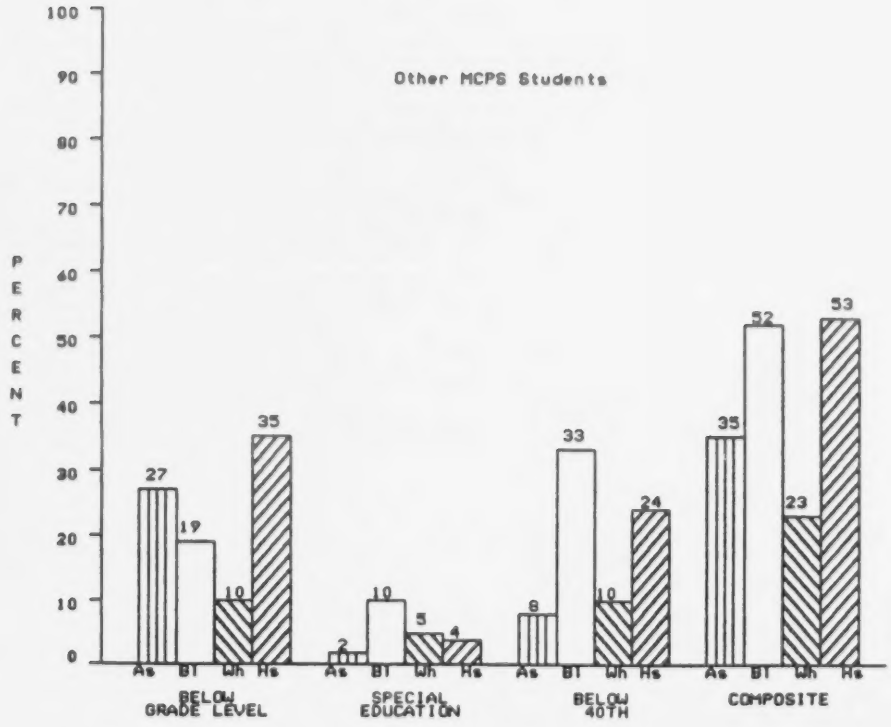
	Inappropriate Grade Placement				Special Education				Below 40th California Test[a]				Composite			
	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs
Head Start																
Percent	0	29	25	17	0	21	19	0	0	69	35	25	0	82	61	40
Total Number	1	108	61	6	1	136	74	6	1	75	43	4	1	129	69	5
Other MCPS																
Percent	27	19	10	35	2	10	5	4	8	33	10	24	35	52	23	53
Total Number	306	540	4883	167	312	593	5072	173	209	417	4145	102	298	569	4819	167

a. Grade 11

Figure 7.2

Outcomes by Ethnicity/Race for
Head Start and Other MCPS Students
Born in 1966





*Fewer than 5 Students

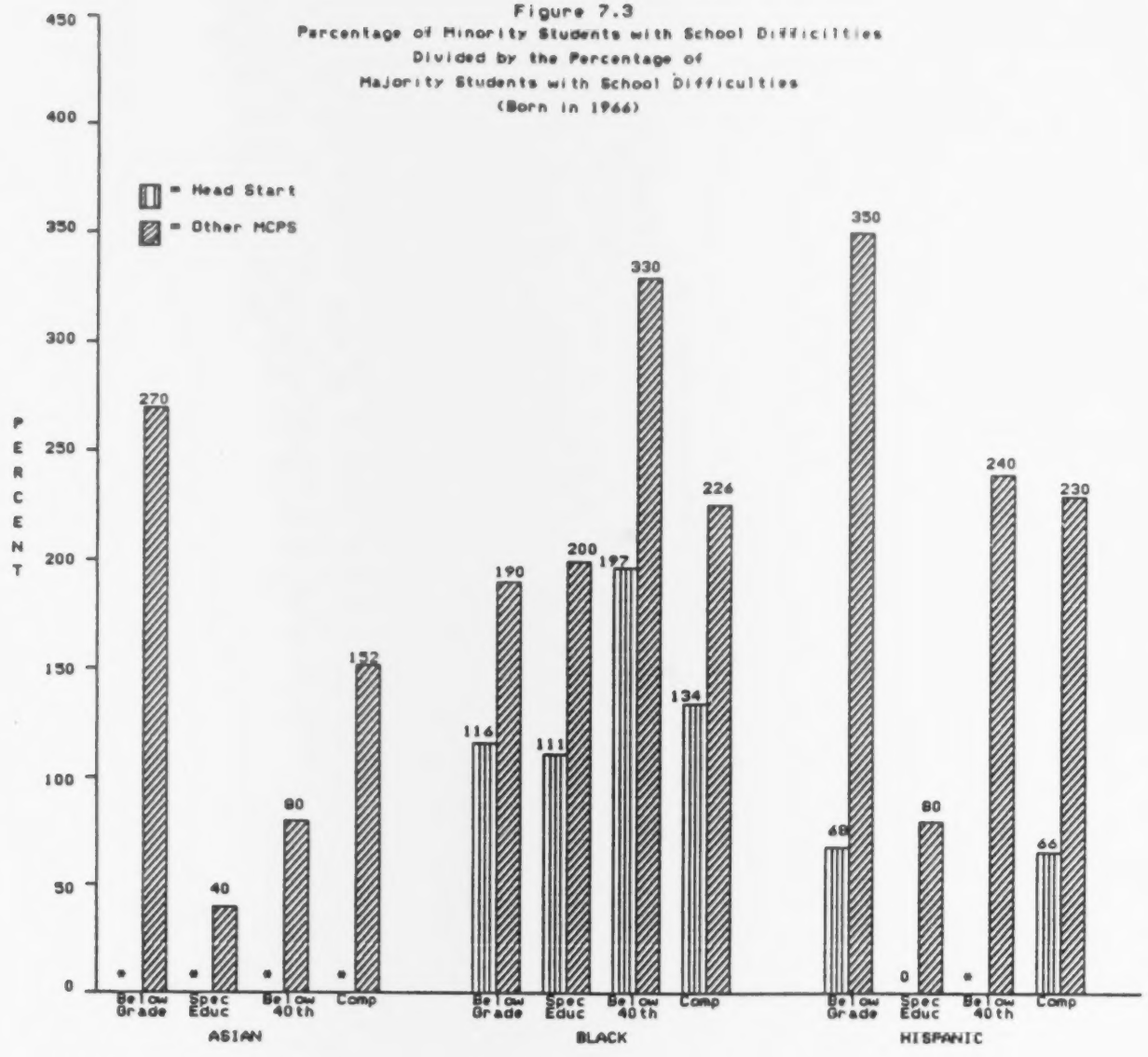
the whites. The "racial difference measure" is 10/5 or 200 percent. This figure can be interpreted to mean that within the population of other MCPS students, there were proportionately twice as many blacks who had been in special education as there were whites. For the Asian students, 2 percent had been in special education compared to 5 percent of the white students. Thus, the difference measure would be 2/5 or 40 percent. Because this measure is a proportion of minority students to white students, if the percentage is less than 100 percent, there were proportionately fewer minority students who had difficulty than there were majority students. If the percentage is greater than 100 percent, more minorities than majority students had difficulty. Head Start minority graduates were always compared to the majority graduates from Head Start; the non-Head Start MCPS minorities were always compared to the non-Head Start majority students. The racial difference measure or "percentage minority/percentage majority" calculations are graphed in Figure 7.3 for the Head Start and other MCPS students born in 1966.

Head Start Sample. The discussion of the racial/ethnic differences within the Head Start group focuses only on the black and white students since there were very few Asian and Hispanic students. (The findings presented in Appendix F for the other two birth years do include data for Hispanic and Asian Head Start students.) The percentages of black and white Head Start graduates who were below grade level or had recently been in special education were fairly similar with slightly more blacks having difficulties as measured by both indicators. The percentage of blacks below grade level was 29 compared to 25 percent for the white students (a difference measure of 116%). The figures for blacks and whites for special education were 21 and 19 percent, respectively, for a racial difference measure of 111 percent. The difference on the California measure was substantial; 69 percent of the blacks had scored below the 40th percentile compared to 35 percent of the whites. In terms of the ratio, proportionately twice as many black Head Start graduates as whites had done poorly on the test. This difference on the CAT also resulted in a difference on the composite variable; 82 percent of the black Head Start graduates had experienced some type of school difficulty compared to 61 percent of the white students.

Other MCPS Students. The data on the Asian non-Head Start students show a strange pattern. On two of the measures, special education and the CAT, the Asian students had proportionately fewer students with problems than the white students. However, proportionately nearly three times as many Asians were in an inappropriate grade for age placement. These may be students who started school later or who came to MCPS while they were in elementary school and who for some reason were placed in a grade below their age (at least four years ago, since all students in the analysis had been continuously enrolled for the last four years). We have no way of knowing why a student was not on grade with his or her agemates.

The pattern of the data for the black "other MCPS" students was similar to that for the Head Start sample, although the difference between blacks and whites was considerably greater among the non-Head Start students. About twice as many blacks as whites were in an inappropriate grade placement and had been in special education placements, but by far the greatest difference was on the CAT. Thirty-three percent of the black students scored below

Figure 7.3
Percentage of Minority Students with School Difficulties
Divided by the Percentage of
Majority Students with School Difficulties
(Born in 1966)



*Fewer than 5 students

the 40th percentile compared to 10 percent of the white students for a difference ratio of over three to one. The composite measure revealed that 52 percent of the black non-Head Start graduates were in an inappropriate grade placement, had been in special education, or had scored below the 40th percentile on the CAT. The corresponding figure for the white students was 23 percent for a racial difference measure of 226 percent.

Thirty-five percent of the Hispanic students who had not attended Head Start were in an inappropriate grade placement, which was the highest percentage of any of the groups. Again, these students may not have been retained; a large number of students who transferred from another school system or even another country may be contributing to these data. Proportionately fewer Hispanic than majority students had been in special education. Twenty-four percent of the Hispanic students scored low on the CAT. Overall, 53 percent of the Hispanic students had experienced some kind of school difficulty. The Hispanic-majority ratio on the composite measure was 230 percent, which was very close to the black-majority ratio.

Comparison of Head Start and Other MCPS Students. The racial difference measures which are graphed in Figure 7.3 show that the differences between the black and white students were considerably greater among the non-Head Start students than among the Head Start sample. For the black and white Head Start graduates, similar percentages were below grade level and had been in special education; for the other MCPS students, the black to white ratio was about 2 to 1. On the CAT, the ratio of black to white low scorers was 2 to 1 for the Head Start sample and over 3 to 1 for the other MCPS students.

Differences by Sex

The percentages of males and females who had experienced problems as measured by the four outcome measures are presented in Table 7.3 and graphed in Figure 7.4. The ratios of males to females are graphed in Figure 7.5.

Head Start Sample. Within the Head Start sample, the proportion of males and females below grade level were close, 28 and 25 percent, respectively. Considerably more males had been in a special education class, 24 to 15 percent, or a difference measure of 160 percent. The difference for the Head Start males and females was greatest for the CAT, where 72 percent of the males scored below the 40th percentile on the test compared to 40 percent of the females (ratio of nearly 2 to 1). Overall, 85 percent of the Head Start males had experienced some kind of difficulty compared to 61 percent of the females, which was a difference measure of 139 percent.

Other MCPS Students. For the "other MCPS" students, the differences between males and females were greatest on the special education measure (ratio of over 2 to 1, males to females), followed by the inappropriate grade placement measure (189%). Seventeen percent of the males were below grade level compared to 9 percent of the females. Seven percent of the males were in special education compared to 3 percent of the females. The difference measure for the CAT was 166 percent, 15 percent of the males compared to 9 percent of the females. Overall, in the non-Head Start population, 34 percent of the males were either below grade level, had been in special

TABLE 7.3

Outcome by Sex for Head Start Sample (1970-71)
and Other MCPS Students Born in 1966

	Inappropriate Grade Placement		Special Education		Below 40th California Test[a]		Composite	
	Male	Female	Male	Female	Male	Female	Male	Female
Head Start								
Percent	28	25	24	15	72	40	85	61
Total Number	88	89	115	103	61	63	108	97
Other MCPS								
Percent	17	9	7	3	15	9	34	20
Total Number	2924	2889	3103	3065	2303	2582	2954	2915

a. Grade 11

Figure 7.4
Outcomes by Sex for
Head Start and Other MCPS Students
Born in 1966

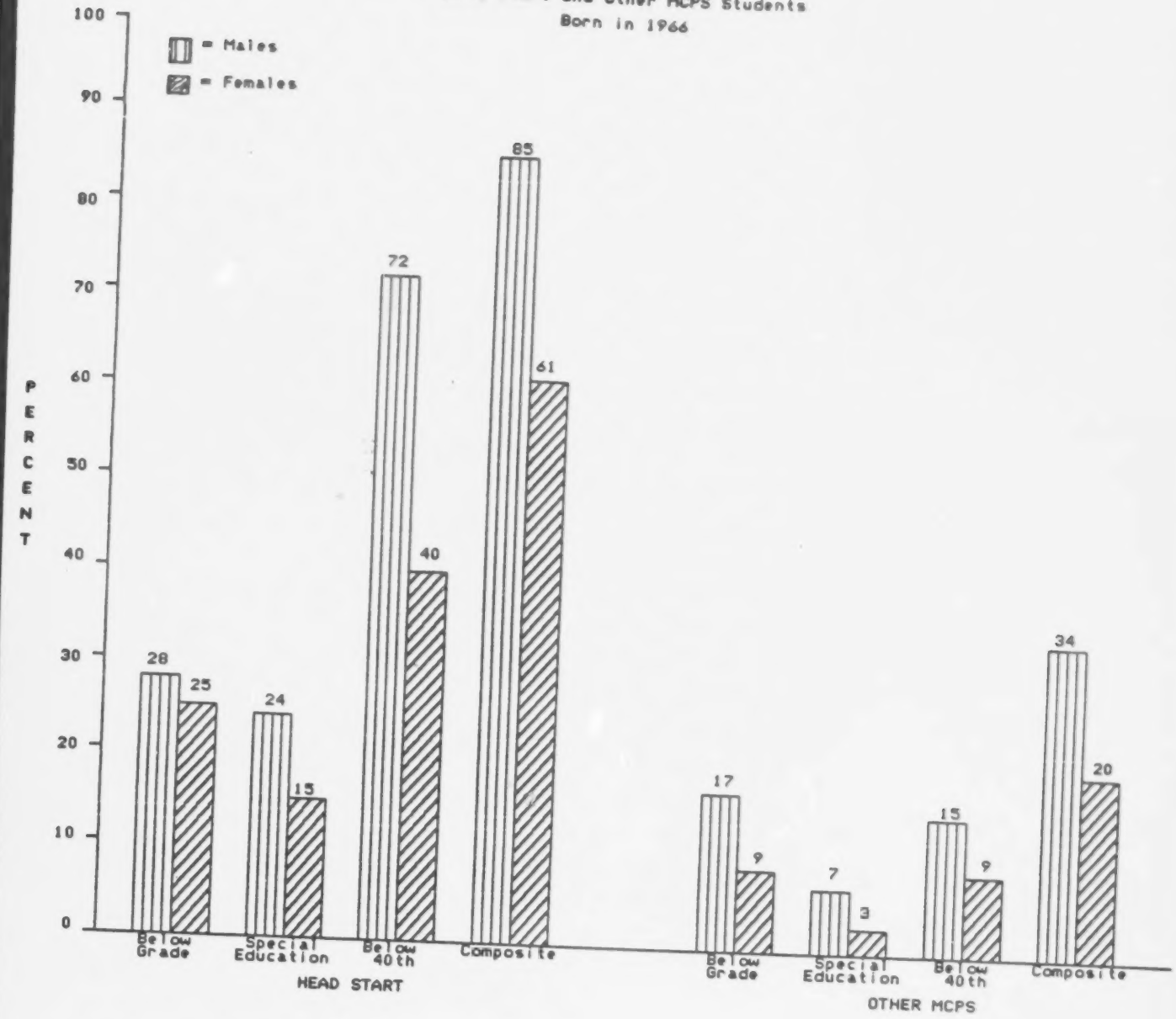
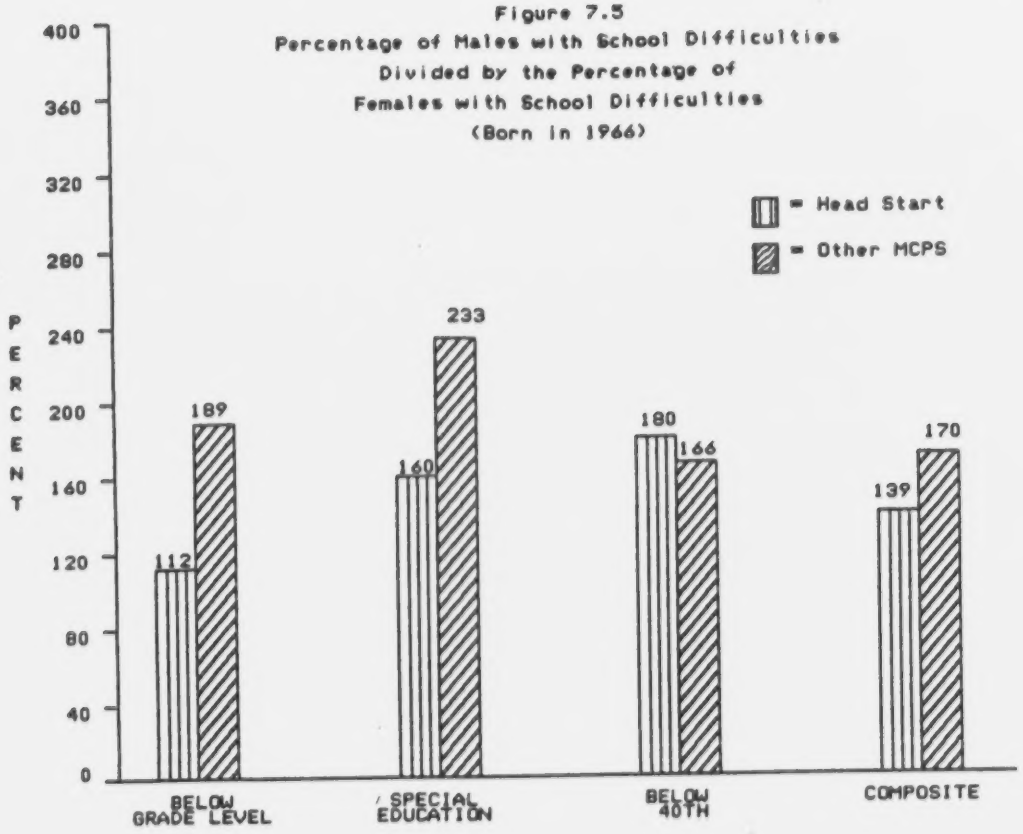


Figure 7.5
Percentage of Males with School Difficulties
Divided by the Percentage of
Females with School Difficulties
(Born in 1966)



education, or had scored low on the CAT. The corresponding figure for the females was 20 percent.

Comparison of Head Start and Other MCPS Students. On every measure regardless of Head Start status, the males performed more poorly than the females. On three of the four measures, the CAT being the exception, the difference between the males and females was less among the Head Start graduates. For both the Head Start graduates and the other MCPS students, between 1-1/2 to 2 times as many males as females scored below the 40th percentile on the CAT.

Differences by Racial/Ethnic Group by Sex

The data for the four outcome measures for the males and females within each of the race groups are briefly summarized in this section. The data for the Head Start students showed that similar percentages of black and white males had experienced academic difficulty. Eighty-nine percent of the black males and 80 percent of the white males had been retained, been in special education, or had scored low on the CAT. The difference between the black and white females was much greater because, in comparison to the other Head Start graduates, the white females did relatively well. As measured by the composite measures, 72 percent of the black females had experienced academic difficulty compared to 46 percent of the white females.

The findings for the other MCPS students showed much larger differences between the majority males and females and their minority counterparts. The figures on the composite measure showed the highest academic difficulty rates for the black males (59%) and the Hispanic males (57%). The figure for the white males was 30 percent. Nearly twice as many minority as majority males had experienced academic difficulty. The pattern for the females was similar, however, the differences were even larger. Forty-nine percent of the Hispanic females and 44 percent of the black females had had some kind of academic difficulty. For the white females, the figure was 16 percent. Nearly three times as many minority as majority girls had experienced some kind of school difficulty.

COMPARISON WITH STUDENTS BORN IN 1970 AND 1974

This section compares the findings for the students born in 1966 with those for the students born in 1970 and 1974 (see Appendix F for more information on the latter two groups). The findings are summarized in Table 7.4. A number of trends held across all three birth years. Looking at the differences between the racial/ethnic groups, the data showed that the Asians generally did better than the majority students and the blacks did worse, regardless of Head Start status. The Hispanic students who attended Head Start generally did better than their majority counterparts. The Hispanic students who were not from the Head Start samples generally did worse. The differences between the blacks and the majority students were consistently less for the Head Start sample. This suggests that family income may be contributing to some of the minority-majority differences often seen in countywide analyses for all MCPS students. It is impossible to know with the analyses presented here how much income differences contributed to the differences by race/ethnicity within the Head Start

TABLE 7.4

Percentage of Minority Students With Difficulties
Divided by Percentage of Majority Students With Difficulties
(Summary Table)

	Asians		Blacks		Hispanics	
	Head Start	Other MCPS	Head Start	Other MCPS	Head Start	Other MCPS
Inappropriate Age for Grade Placement						
1966[a]	-[b]	270	116	190	68	350
1970	0	191	114	145	124	263
1974	46	100	141	210	79	200
Special Education						
1966	-[b]	40	111	200	0	80
1970	0	60	208	200	83	60
1974	44	25	200	250	44	175
Below 40th Percentile						
1966	-[b]	80	197	330	-[b]	240
1970	0	67	168	350	68	150
1974	61	50	189	363	96	313
Composite						
1966	-[b]	152	134	226	66	230
1970	0	133	138	190	98	181
1974	61	79	149	258	88	237

Note: Table entries are percentages of majority figures. If number is less than 100, fewer minority students than majority students experienced difficulties. If number is more than 100, more minority students than majority students experienced difficulties. Table entries can also be read as ratios, e.g., 150 percent = 1.5 to 1.

a. If on grade level, equivalent to
1966 = Grade 12
1970 = Grade 8
1974 = Grade 4

b. Fewer than five students in cell.

population. (This was addressed by the regression analysis in Chapter 4.)

In looking at the data for the "inappropriate grade for age" indicator, the reader is reminded that for the other MCPS students, this measure may or may not have been an indicator of retention. Some of the large differences found between the minority and majority students on this measure may well be a reflection of a number of minority students being placed in a grade below their age when they transferred into MCPS. For the Head Start students, the data in Table 7.4 on this measure represent percentage retained divided by percentage retained. Within the Head Start sample, the differences between the blacks and whites were negligible for all but the youngest students. For these students, the black-to-majority retention ratio was 1.4 to 1. The Hispanic Head Start students had a strange pattern with the oldest and youngest Hispanic students retained less than the majority students and the middle group being retained more.

The special education measure showed that regardless of birth year or Head Start status, Asians and Hispanics were generally placed in high-level special education less than majority students. The one exception was the youngest group of Hispanics who did not attend Head Start. By fourth grade, nearly twice as many other MCPS Hispanic as majority children had been placed in special education. Approximately twice as many black as majority students had been placed in special education regardless of year of birth or Head Start status.

On the CAT, the ratio of black low scorers to white low scorers was about 2 to 1 for the Head Start sample regardless of birth year. The ratio for the other MCPS students was over 3 to 1 for all three birth years. The Head Start Hispanic graduates had fewer low scorers than their majority counterparts. There was a tremendous range in the majority/Hispanic difference for the other MCPS students. The ratio ranged from 1.5 to 1 for the students born in 1970 to over 3 to 1 for the students born in 1974.

The analyses by sex showed very consistently that regardless of grade level, outcome measure, or Head Start status, the males experienced more problems than the females (see Table 7.5). The differences were not large and generally did not approach those found for the minority-majority comparisons, but the pattern was very consistent. By far, the differences between males and females were greatest with regard to special education. For the students who had attended Head Start, the male to female ratio ranged from 1.6 to 1 to slightly over 3 to 1. For the other MCPS students, it ranged from 1.7 to 1 to 2.7 to 1.

The analyses by racial/ethnic group by sex pinpointed three groups that were having the highest proportion of school difficulties. They were the black males, the black females, and the Hispanic males. For the Head Start graduates born in 1974, 78 percent of the black males, 68 percent of the black females, and 62 percent of the Hispanic males were in an inappropriate grade placement, had been in special education, or had scored low on the CAT. For the other MCPS students, the numbers were lower, but the same three groups had by far the highest percentages. For the black males, females, and Hispanic males, the figures were 53, 49, and 59 percent, respectively. The pattern was similar for the other two birth years regardless of Head Start attendance.

TABLE 7.5

Percentage of Males With Difficulties Divided
by Percentage of Females With Difficulties
(Summary Table)

	Head Start	Other MCPS
Inappropriate Grade for Age Placement		
1966[a]	112	189
1970	132	178
1974	113	188
Special Education		
1966	160	233
1970	313	266
1974	188	167
Below 40th Percentile		
1966	180	166
1970	81	129
1974	116	150
Composite		
1966	139	170
1970	116	161
1974	116	165

Note: Table entries are percentages of female figures. If number is less than 100, males had fewer difficulties than females. If number is more than 100, males had more difficulties than females. Table entries can also be read as ratios, 150 percent = 1.5 to 1.

a. If on grade level, equivalent to:

1966 = Grade 12
1970 = Grade 8
1974 = Grade 4

Because the data are from three different grade levels, questions can be addressed about changes over time and/or as a function of age of the student. For example, how do the racial/ethnic differences among the fourth graders compare with those of the twelfth grade students? It would not be surprising to find that the data from the three grade levels are not similar for a number of reasons. With the "inappropriate grade for age placement" measure, the older students have had a substantially greater number of years in which to get retained. Special education in the elementary schools may not operate in the same way as in the secondary schools. The CAT may not mean as much to students in eleventh grade as it does to students in third grade.

What is interesting about the race and sex data is that they are remarkably consistent from year to year with only a few exceptions. The consistency is not only in the overall pattern (black students and Hispanic males had the highest percentages of difficulties; Asians had a small proportion of students with difficulties; males had more difficulty than females; and the Head Start sample had more problems than other MCPS students) but also in the numbers themselves. For example, for the non-Head Start students, the percentage of blacks in special education was 10 percent for birth years 1966, 1970, and 1974. The corresponding percentages for majority students were 5, 5, and 4 percent. The percentage of black students who scored low on the CAT was 33, 21, and 29 percent for birth years 1966, 1970, and 1974. For majority students, the figures were 10, 6, and 8 percent. There were some exceptions to the consistency across grade levels. On the CAT, there were 27 percent of the MCPS Hispanic students who were born in 1966 who scored below the 40th percentile, 9 percent for those born in 1970, and 25 percent for those born in 1974.

In sum, the analysis of differential outcomes by racial/ethnic group and sex showed several things. First, with regard to the minority/majority student gap, the differences between the minority and majority students were less for the Head Start children than for the other students in MCPS. In fact, within the Head Start sample, the Asian and Hispanic students generally had the same percentage or a smaller percentage of students with difficulty than the majority students. Although the black Head Start graduates had experienced proportionately more problems than the white Head Start graduates, the differences between these two groups were not as great as those for their counterparts within the rest of the MCPS population. The lesser difference between the majority and black students within the population of Head Start graduates, a low-income population, in comparison to the other MCPS students, suggests that differences in family income may be contributing to the extent of the black-majority gap in MCPS.

Second, the analyses in this chapter point to several groups of students as disproportionately represented on any of the measures of school difficulty. Males consistently had more school problems than females. Black and Hispanic males in particular had high percentages of students with problems, as did black females. The data, unfortunately, cannot provide any answers as to why this is happening. The numbers can only provide evidence of the extent of the problem.

Lastly, these analyses again emphasize the findings from the previous chapter about the performance of children from low-income families in MCPS. An extremely high proportion of both majority and minority children from

low-income families are experiencing problems in the Montgomery County Public Schools.

CHAPTER 8

CONCLUSIONS - PART 2

The following questions were addressed by Part 2 of the study:

1. How do low-income students (the Head Start sample) compare to other students in MCPS with regard to academic achievement?

2. Are there differences in outcomes for these students when the data are analyzed by racial/ethnic group membership or sex, and how do these differences compare to those for the other students in MCPS?

This chapter summarizes the findings for Part 2 and discusses their implications.

THE PERFORMANCE OF A LOW-INCOME POPULATION IN MCPS

The only fair test of a program's effectiveness is to see whether a group that participated in the program did better than a similar group of students who did not. The issue of program effectiveness was addressed in Part 1 of this study. The effectiveness of the Head Start Program cannot in any way be determined by comparing the performance of the Head Start graduates to the rest of the MCPS population. While the Head Start students come from low-income families, many of the other students in MCPS come from not only moderate but high-income families. The life situations of the Head Start and other MCPS students are so drastically different throughout the students' school years that drawing any conclusions about the effectiveness of Head Start based on the relative performance of these two groups would be ludicrous.

Viewing the performance of the Head Start sample in comparison to that of other MCPS students, which was the focus of Part 2, can serve a useful purpose. If the performance of the average MCPS student is used as the standard, then we can ask how successful the school system has been in educating all students to that standard. By definition, an average will have some students below and some students above; however, when one group of students, e.g., males, blacks, and low-income students, is disproportionately represented among those below the average, there is cause for concern. An overrepresentation of any group among the low achievers indicates that the education being provided is less effective for them overall and raises the possibility that conditions within the school system may be operating in such a way as to bring about that overrepresentation or, at least, not operating in such a way as to prevent it.

The follow-up data on the Head Start students from 1970-71 represents educational outcomes after 14 years in MCPS. Except for a very small number of students who left the school system and came back, these students received their entire education from the Montgomery County Public Schools. Their educational performance provides an indicator of how successful MCPS has been in educating children from low-income families.

On a ranking measure which incorporated a number of indicators of school performance, 40 percent of the Head Start sample from 1970-71 was classified by 1983-84 as having "serious problems" which was the bottom point on the scale. Another 34 percent percent were classified as "poor" or "low average" students. In comparison to the other students in MCPS born in 1966, proportionately about twice as many of the Head Start sample from 1970-71 had been retained, nearly four times as many had been in a special class or special school during the preceding four years, and nearly five times as many had scored low on the Grade 11 California Achievement Tests.

When the findings are examined across the three cohorts studied as part of the evaluation, it can be seen that students from low-income families are performing poorly regardless of grade level. The retention rates for the Head Start graduates born in 1966, 1970, and 1974 were 27, 22, and 26 percent, respectively. The percentage of students who scored below the 40th percentile on their most recent California Achievement Tests was 56, 30, and 34, respectively. If MCPS were now doing a better job with students from low-income families than in the past, one would expect to see a marked trend to lower rates of school difficulty for the younger students. No such trend was present in the data. The absence of such a pattern suggests that the situation for low-income students in MCPS has shown no signs of substantial improvement over the past decade.

Unfortunately, there are no comparable data from other school systems with regard to many of the outcomes for students from low-income families. There is no way of knowing whether the retention or special education percentages found for the low-income MCPS students are high, low, or average relative to other school systems. The data indicate a serious problem regardless of the situation in other school systems, but it would be helpful if the numbers could be put in perspective.

The figures for the Head Start graduates from 1970-71, and the figures for the fourth and eighth graders of 1983-84 which were very similar, provide an indicator of how well students from low-income families are doing in MCPS. The conclusion is that as a group, these students are not doing very well.

DIFFERENCES BY RACIAL/ETHNIC GROUP AND SEX

Examining outcomes for the Head Start samples provided a unique opportunity to learn how students from low-income families with different racial and ethnic backgrounds fare in the Montgomery County Public Schools. The racial differences among the Head Start samples in comparison to those for the rest of MCPS could also provide insight as to whether or not differences in family income could partially account for the differences so often seen in MCPS student data. An absence of minority/majority differences in a low-income population would raise the possibility that the differences often found within MCPS may be a function of family income. The sex differences were also compared for the Head Start and MCPS groups. For these analyses, the Head Start sample's performance was contrasted with that of all other MCPS students born in the same year.

The picture with regard to income and race in these data was not as clear-cut as one would hope. An analysis of family income for the Head Start families showed that the black families had a statistically significant

lower family income than the white families for each of the three Head Start cohorts. This means that any outcome differences between the blacks and whites within the Head Start samples are difficult to interpret because of the income differences.[1]

The findings from the analysis of differences showed that the differences between the minority and majority students were less for the Head Start sample than for the non-Head Start students in MCPS. There were few differences between the white, Asian, and Hispanic Head Start graduates, and those between the white and the black students were much less than those between their counterparts in the rest of MCPS. For example, for the students born in 1966 (Grade 12 in 1983-84), the ratio of blacks to whites with low scores on the Grade 11 California Achievement Tests was about two to one for the Head Start sample. The same ratio for the other MCPS students was over three to one; i.e., there were proportionately three times as many blacks with low scores as there were whites with low scores.

The analysis of differences also pinpointed three groups who have been experiencing a disproportionate number of school difficulties: black males, black females, and Hispanic males. This finding appears to hold for the Head Start sample as well as the other MCPS students although only one of the three Head Start groups had a sufficient number of Hispanic males upon which to base any conclusions. The finding was very strong for the other MCPS students and held for all three years examined. Students from these three groups regardless of whether or not they attend Head Start are at a much higher risk for failure than are Asians, white males and females, and Hispanic females.

While the data for all of the Head Start graduates are of concern with regard to later performance, the findings for the black students are particularly so. For the blacks who attended Head Start in 1970-71, 29 percent of those still enrolled had been retained by 1983-84, 21 percent had been in a Level 4 or more special education class in the last four years, and 69 percent had scored below the 40th percentile on the eleventh grade administration of the California Achievement Tests. Eighty-two percent had had one of these three problems; or looking at the reverse, only 18 percent of the black Head Start graduates had not been retained, not been in special education recently, and had scored at or above the 40th percentile on the California Achievement Tests.

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1. As presented in the summary of the findings of Part 1, a regression analysis of the data for the Head Start population showed that some of the differences were due primarily to income, while on other measures, even with income controlled, there was an unexplained difference between black and white students. This same kind of more sophisticated analysis could not be undertaken with the data for the other MCPS students because family income data are not available.

IMPLICATIONS

Compared to the rest of the MCPS population, the students in the Head Start sample experienced a disproportionate number of academic problems in elementary and secondary school. This was true despite the fact that Head Start helped them perform better than they would have done without it. Unfortunately, the data from the study cannot explain why this situation occurred. Several hypotheses are possible.

- One hypothesis is that the children leave Head Start having made substantial gains in a number of developmental areas. They enter kindergarten with a higher skill level[2] than children from comparable families who did not attend Head Start.[3] Their status relative to other children from more socioeconomically advantaged families who make up a substantial proportion of the MCPS population is unknown. If the Head Start graduate enters kindergarten with less well-developed skills than "the typical Montgomery County kindergartener," if the class is made up of many children from more socioeconomically advantaged families, and if the teacher's perception of a child's classroom performance and behavior is influenced by the relative skill level of the class, then the Head Start graduate enters kindergarten at a disadvantage. Regardless of the fact that the Head Start graduates are performing better than they would have without Head Start, their skill levels may still be below that of their classmates. The distance between them may stay the same or get even wider as time goes by.

- Another possibility is that the Head Start graduates arrive in kindergarten as ready as the "typical Montgomery County kindergartener." However, as the school year or years go on, a gap begins to emerge between the socioeconomically advantaged and those who are not so advantaged.

Any number of factors have been postulated as contributing to the achievement discrepancy between low-income and higher-income students. This discrepancy has been found in numerous other studies besides this one. Possibilities include teacher behavior, classroom structure, conflict of cultures, insufficient individual attention, and a variety of home factors. In a school system where overall achievement is very high, the curriculum in general and the focus of instruction in particular may be geared at a level

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2. The phrase "skill level" is used to describe the entire set of behaviors, attitudes, abilities, prior knowledge, etc., that enable a child to function successfully in the classroom. It encompasses the personal-social as well as the cognitive requirements.

3. Kindergarten performance data were not available to this study; the first individual achievement measure was administered in third grade. Given the data available, it cannot definitely be concluded that the Head Start group outperformed other low-income students in kindergarten. However, given the pattern of the evidence as well as the findings of a number of other studies of early childhood programs, it is a reasonable inference.

which is inappropriate for some students and results in their becoming progressively farther behind. Whatever is responsible for the poor performance of low-income students in other school systems, the problem may be magnified in Montgomery County because the socioeconomic distance between the richest and the poorest families is so great.

The findings from this study indicate the need to carefully examine the type of education currently provided to low-income students in the Montgomery County Public Schools. This examination needs to focus on instruction in the regular classroom as well as the total package of remedial and special services for low-income students, including programs such as Head Start, Chapter 1, and Quality Integrated Education. Although it was impossible to investigate the type and extent of special services that the Head Start graduates received in elementary and secondary school because of poor documentation in the records, it is reasonable to assume that many were the recipients of a number of such services. The poor performance of these low-income students compared to their higher-income peers raises questions about the effectiveness of regular education and the mix of supplemental services when viewed as a total system.

Issues which need to be examined with regard to the regular instruction and/or special services provided to low-income students include the following:

- Appropriateness
- Comprehensiveness
- Coordination
- Quality
- Availability
- Inefficiencies due to overlap
- Conflicts in regulations and practices

It should also be noted that the discrepancy in academic performance as a function of family background is not a problem unique to the Montgomery County Public Schools. The problem and its solution have challenged educators nationwide (Frechtling, Raber, and Ebert, 1984).

As the superintendent and the Board of Education recognized in the recently adopted priorities, some type of change is needed for some students in MCPS. This study demonstrated that MCPS, like other school systems, has not thus far found a way to prevent a disproportionate rate of academic problems among students from low-income families. While the study's findings reflect history for several groups of Head Start students, they do not necessarily predict the future for the Head Start students of 1984-85. However, given that the findings for the fourth graders and the eighth graders paralleled those for the oldest students with regard student performance, it seems safe to maintain that history certainly can repeat itself. Unless the Head Start class of '85 is provided, as they move through the grades, with a different kind of education than their older brothers and sisters received, there is no reason to believe the outcomes or the relationships between background characteristics and outcomes for these children will be any different.

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APPENDIX A

ADDITIONAL INFORMATION ABOUT THE OUTCOME MEASURES

All outcome measures described below were computed only for students who had been enrolled continuously for the last four years.

Retained/Inappropriate Grade for Age Placement

For the Head Start and comparison groups, a child was considered to be below grade level if she or he presently was not enrolled in at least the appropriate grade level based on the year of Head Start application and the year of birth.

For the total MCPS group, all children not in the appropriate grade level based on the year of birth were counted as below grade level. This count may not actually reflect the number of students retained, however. For the total MCPS group, it was impossible to tell if a child had actually been retained or had started school a year late. Only current grade level, not grade level for each year, is retained on the pupil data base.

Children in Grade 16 (special classes) were excluded on this variable since they had not been retained, but they were also not on grade level.

In Level 4 or More Special Education

A child was considered to have been in Level 4 or more special education if at least once during the preceding four years the child had been enrolled in a Level 4, 5, 6, or 7 special education placement. These levels represent special classes, special schools, residential institutions, and home or hospital instruction. Students in lower-level placements, e.g., itinerant services or resource room, were not counted as being in special education. This measure was available for all students.

The accuracy of this measure is totally dependent on the accuracy of the information on the Computerized Educational Data System (CEDS) which served as the source of the data. As CEDS was relatively new in 1980-81, there is some question as to the accuracy of the early information. Even if there are some errors in the CEDS historical data, that should not bias the evaluation in that there is no reason to believe that the data for the Head Start group is any more or less inaccurate than the data for the comparison group.

Below Grade Level or in Level 4 or More Special Education

Any student who fitted into either or both of the two preceding categories was counted positively for this measure. To be counted in both of the preceding categories, a student would have had to have had a grade designation in 1983-84 which indicated retention and to have been in Level 4 or more during the preceding three years.

Below 40th Percentile on the Total Battery, California Achievement Tests

Students who scored below the 40th percentile were counted positively for this variable. Students who did not take the test (e.g, those retained and those in special classes) were excluded. They are counted as missing on this measure.

Below Grade Level, in Level 4 or More Special Education, or Below the 40th Percentile on the California Achievement Tests (Composite Variable)

Students who met one or more of these conditions were counted positively on this measure. Students who had not been retained and had not been in special education and were missing California Achievement Test Scores were excluded.

APPENDIX B

ATTRITION

The rate at which Head Start graduates have left the school system provides interesting data for the evaluation for two reasons. First, it provides an indicator of the permanence of the population served by the Head Start Program. It answers the question of how long the students served by Head Start stay in the Montgomery County Public Schools. Second, the rate is important with respect to its implications for the validity of the study's conclusions.

Attrition refers to the loss of cases over time in a long-range study. Attrition presents a problem for longitudinal evaluations because the results for students who are no longer available for study may not be the same as those for the students who are. Since conclusions are based on the findings from only the later group of students, in the worst case, the conclusions may be in error.

The tables and graphs on the next pages present the percentage of students enrolled at several time points for the three groups of Head Start graduates. For all three cohorts of students, the rate of attrition for the Head Start and comparison groups was similar. There did appear to be large differences in the percentages of students who enrolled in MCPS in the first place, with the Head Start students being much more likely to enroll.

Additional information about which students left MCPS is presented in Appendix C.

TABLE B-1

Attrition for 1970-71 Sample

	1970-71		Grade											
	N	%	K '72	1 '73	2 '74	3 '75	4 '76	5 '77	6 '78	7 '79	8 '80	9 '81	10 '82	11 '83
			Percent of '71											
Head Start	458	100	85	83	80	78	77	76	75	74	72	70	69	64
Comparison	153	100	67	60	54	52	50	49	49	50	47	47	44	41

Figure B-1
Percent Enrolled Each Year by Group
(1970-71 Cohort)

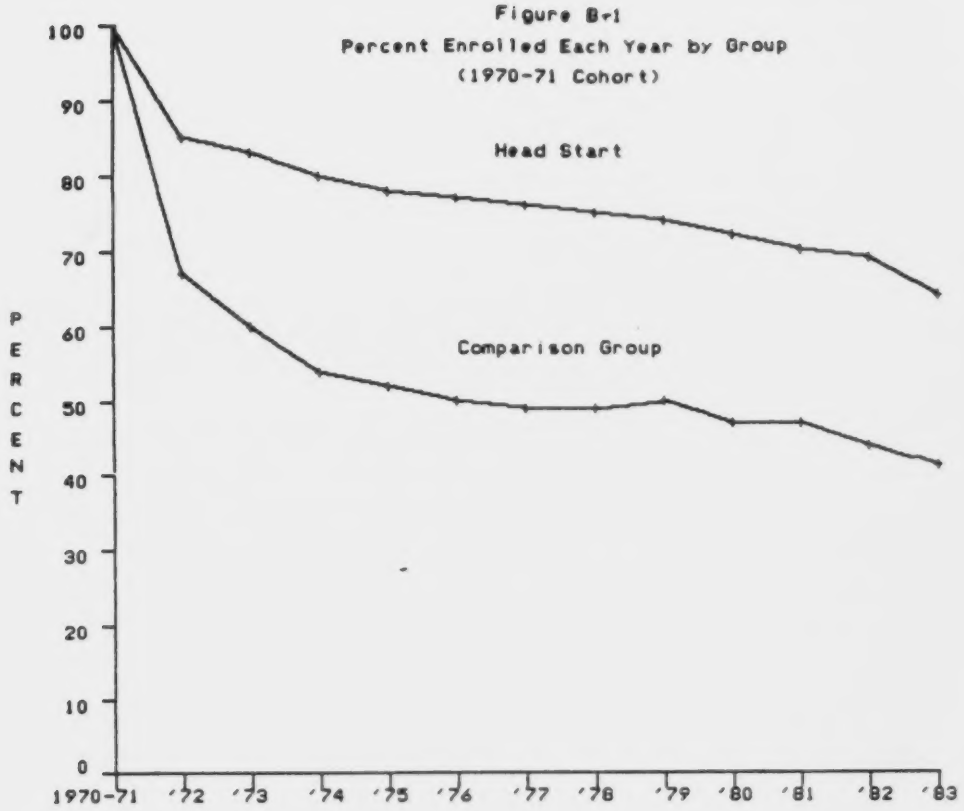


TABLE B-2

Attrition for 1974-75 Sample

	1978-79		1980-81 (Grade 5)		1980-81 (Grade 6)		1980-81 (Grade 7)		1980-81 (Grade 8)		Percentage in MCPS for Last 4 Years[a]	
	N	%	#	% of '79	N	% of '79	N	% of '79	#	% of '79	#	% of '79
Head Start	852	100	538	63	521	61	508	60	493	58	458	54
Comparison	314	100	139	44	137	44	133	42	127	40	113	36

a. These students were enrolled in MCPS every year from 1980-84.

Figure B-2
Percent Enrolled Each Year by Group
(1974-75 Cohort)

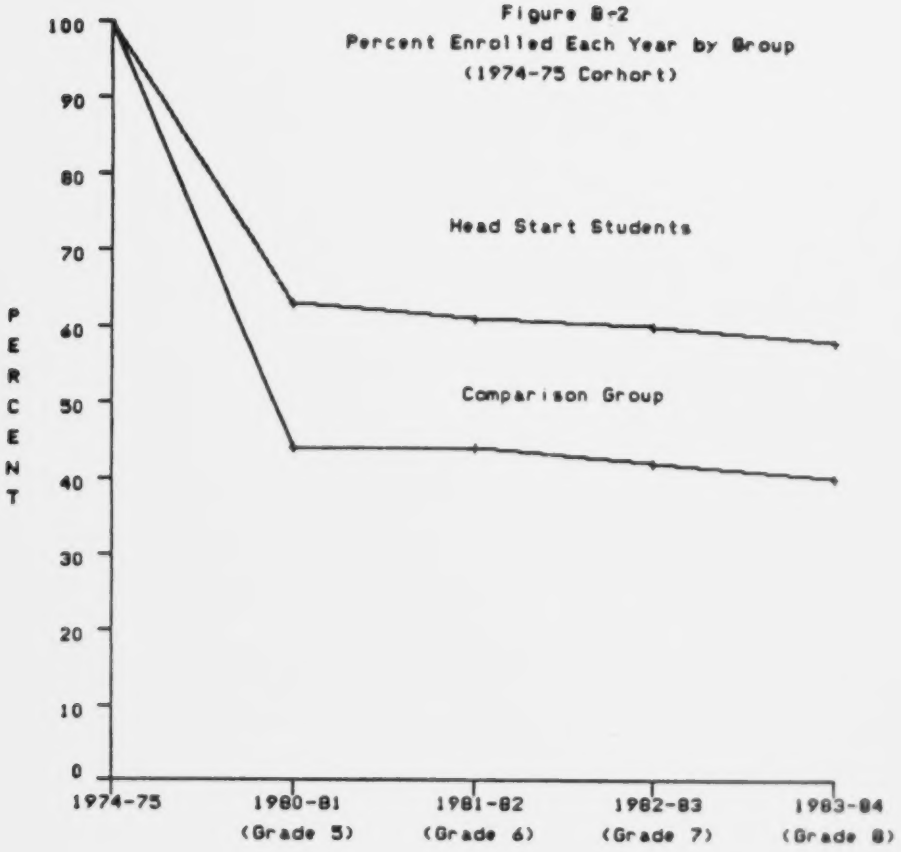


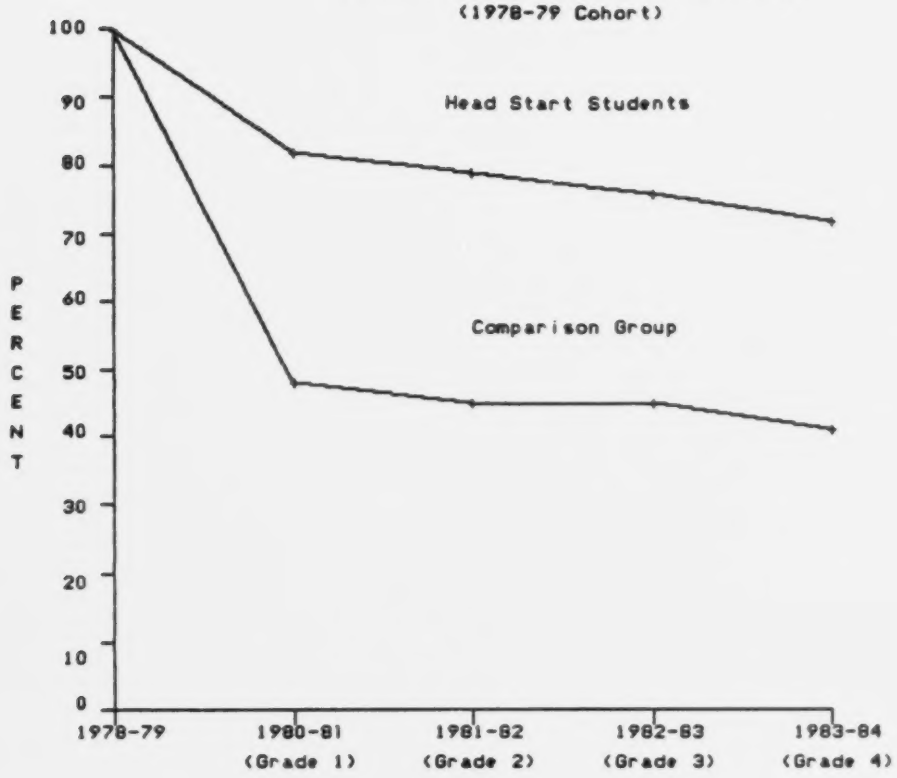
TABLE B-3

Attrition for 1978-79 Sample

	1978-79		1980-81 (Grade 1)		1980-81 (Grade 2)		1980-81 (Grade 3)		1980-81 (Grade 4)		Percentage in MCPS for Last 4 Years	
	N	%	N	% of '79	N	% of '79	N	% of '79	N	% of '79	N	% of '79
Head Start	605	100	499	82	476	79	458	76	435	72	411	68
Comparison	249	100	116	47	113	45	112	45	103	41	87	35

a. These students were enrolled in MCPS every year from 1980-84.

Figure B-3
Percent Enrolled Each Year by Group
(1978-79 Cohort)



APPENDIX C

DEMOGRAPHIC INFORMATION

The demographic information collected from the records at the time of application to Head Start was vitally important to the evaluation in that these indicators were the only measures of the comparability of the Head Start graduates and the children who did not attend the program. To examine the differences between these two groups of children, percentages or means, as appropriate, were computed for each of the six demographic variables for each group of children. The demographic indicators were the following:

- Sex
- Race/ethnic group
- Family income (per year rounded to nearest thousand)
- Number of people in household
- Per person income (family income/number of people)
- Mother's occupation

  Coded on a 9-point scale as follows:

  1 = executives, major professionals
  2 = managers, proprietors
  3 = administrative personnel
  4 = clerical
  5 = skilled workers
  6 = semi-skilled workers
  7 = unskilled workers
  8 = retirement, pension
  9 = unemployed

- Mother's education

  Coded on a 7-point scale as follows:

  1 = no high school
  2 = some high school
  3 = high school graduate
  4 = high school graduate, some college
  5 = 1-3 years college
  6 = college graduate
  7 = post graduate work

- Number of parents in the home

The demographic data are also informative because they present a picture of the type of population served by the Head Start Program. Other analyses presented in this appendix examine the differences between the remaining Head Start and comparison students in 1983-84 and the differences within the group (Head Start or comparison) for those who are still enrolled and those who have withdrawn. All demographic data were collected, however, **at the time of application to the Head Start.**

INITIAL AND LATER DIFFERENCES BETWEEN THE HEAD START AND COMPARISON STUDENTS

Tables C-1 through C-3 present the demographic information for each of the three cohorts of Head Start students and their respective comparison students. One half of each table presents the data for the two groups at the time of Head Start application; the second half presents the same information but only for those students who were still enrolled in 1983-84.

TABLE C-1

Characteristics of 1970-71 Head Start
and Comparison Samples in 1971 and 1984

Characteristic		1970-71 (Head Start) HS	1970-71 (Head Start) Co.	1983-84 (Grade 12) HS	1983-84 (Grade 12) Co.
	N =	458	153	218	44
% male		53	57	53	72*
% minority		54	43	66	61
% single parent families		30	19*	30	12*
$\bar{X}$ income		4685	6737**	4626	8156**
$\bar{X}$ number of people in household		6.0	4.5**	6.0	4.8**
$\bar{X}$ per person income		892	1463**	901	1707**
$\bar{X}$ mother's education		2.4	2.7**	2.3	2.9*
$\bar{X}$ mother's occupation		8.4	8.3	8.3	8.2

Note: Data collected at time of enrollment in Head Start. Data for 1983-84 based on student remaining in sample at that time who had been continuously enrolled between 1980 and 1984.

*$p < .05$
**$p < .01$.

0119g

TABLE C-2

Characteristics of 1974-75 Head Start
and Comparison Samples in 1975 and 1984

Characteristic	N =	1974-75 (Head Start) HS 848	1974-75 (Head Start) Co 312	1983-84 (Grade 8) HS 458	1983-84 (Grade 8) Co 113
% male		55	51	53	56
% minority		44	27**	49	20**
% single parent families		27	19	29	19**
$\bar{X}$ income		7675	11207**	7284	11758**
$\bar{X}$ number of people in household		4.7	4.2**	4.8	4.3*
$\bar{X}$ per person income		1766	2773**	1694	2795**
$\bar{X}$ mother's education		2.9	3.5**	2.7	3.5*
$\bar{X}$ mother's occupation		7.8	7.5*	7.8	7.2*

Note: Data collected at time of enrollment in Head Start. Data for 1983-84 based on student remaining in sample at that time who had been continuously enrolled between 1980 and 1984.

$p < .05$.

0119g

TABLE C-3

Characteristics of 1978-79 Head Start
and Comparison Samples in 1979 and 1984

Characteristic		1978-79 (Head Start) HS	1978-79 (Head Start) Co	1983-84 (Grade 4) HS	1983-84 (Grade 4) Co
	N =	605	249	411	89
% male		51	49	53	50
% minority		47	46	47	44
% single parent families		39	37	42	41
$\bar{X}$ income		8084	9120	8153	10063
$\bar{X}$ number of people in household		4.5	3.8**	4.5	3.7*
$\bar{X}$ per person income		1983	2636**	1992	2845*
$\bar{X}$ mother's education		2.9	3.5*	3.0	3.3
$\bar{X}$ mother's occupation		8.0	7.1***	8.1	6.8**

Note: Data collected at time of enrollment in Head Start. Data for 1983-84 based on student remaining in sample at that time who had been continuously enrolled between 1980 and 1984.

*p <.05
**p <.01

0119g

These tables show that the comparison groups were different in some important ways from the Head Start group at the time of application to the program. These differences between the groups not only held but sometimes increased for those students who were enrolled in 1983-84. For example, for the 1974-75 cohort, family income for all Head Start and comparison students at Head Start application was $7,675 versus $11,207 ($p < .01$). Nine years later, only 458 Head Start students and 113 comparison students remained. Their average family incomes at Head Start application were $7,284 versus $11,758. The remaining students represented the lower income Head Start families and the upper income comparison families. This issue is further examined in the next section.

DIFFERENCES BETWEEN THOSE WHO LEFT AND THOSE WHO STAYED

Tables C-4 through C-6 present the data which address the question of the extent of the differences between the students who have withdrawn and those who have been enrolled continuously between 1980 and 1984. Data are again presented separately for each of the three Head Start years.

For the most part, the data offer little evidence to suggest that the students who remained in MCPS were statistically different from those who left. For the 1978-79 group, significantly more of single parent Head Start families remained in the system. For the 1974-75 cohort, more of the Head Start and comparison minorities families stayed. For the Head Start group, those who remained were from families with less educated mothers. For the 1970-71 cohort, a disproportionate number of minority students from both the Head Start and comparison groups remained in MCPS. Also, for the comparison group, the students who were still enrolled had higher family incomes at the time of application to Head Start.

MISSING DATA

Unfortunately, a proportion of the Head Start graduates from each of the three years had to be eliminated from the analyses because the information was not available for them on one or more of these demographic indicators. Tables C-7 through C-9 shows the proportion of students with missing data for each variable.

TABLE C-4

Differences Between Students Enrolled and Not Enrolled
for Head Start and the Comparison Groups
(1970-71 Cohort)

Characteristic	Still Enrolled in 1983-84? Head Start Yes	Head Start No	Comparison Yes	Comparison No
	N^a = 218	240	44	109
% male	53	53	72	51*
% minority	66	39**	61	29**
% single parent families	30	29	12	22
$\bar{X}$ income	4626	4735	8156	6087*
$\bar{X}$ number of people in household	6.0	6.0	4.7	4.5
$\bar{X}$ per person income	901	885	1707	1354*
$\bar{X}$ mother's education	2.3	2.4	2.9	2.6
$\bar{X}$ mother's occupation	8.3	8.4	8.1	8.4

[a]Represents number of students in the groups, however the N for any one indicator may be less depending on the number with missing data.

*$p < .05$
**$p < .01$.

TABLE C-5

Differences Between Students Enrolled and Not Enrolled
for Head Start and the Comparison Groups
(1974-75 Cohort)

Characteristic	Still Enrolled in 1983-84? Head Start Yes	Head Start No	Comparison Yes	Comparison No
	N^a = 458	394	113	201
% male	53	58	56	48
% minority	49	39**	20	33*
% single parent families	29	24	19	19
$\bar{X}$ income	7284	8129	11758	10893
$\bar{X}$ number of people in household	4.8	4.6	4.4	4.2
$\bar{X}$ per person income	1694	1850	2995	2760
$\bar{X}$ mother's education	2.7	3.1**	3.6	3.6
$\bar{X}$ mother's occupation	7.9	7.8	7.2	7.7

[a]Represent number of students in the groups, however the N for any one indicator may be less depending on the number with missing data.

*Differences between students enrolled and not enrolled statistically significant, $p < .05$.

**$p < .01$.

0119g

TABLE C-6

Differences Between Students Enrolled and Not Enrolled for Head Start and the Comparison Groups

(1978-79 Cohort)

	Still Enrolled in 1983-84?			
	Head Start		Comparison	
	Yes	No	Yes	No
N[a] =	411	194	89	160
% male	53	46	49	50
% minority	47	46	49	44
% single parent families	42	32*	34	41
$\bar{X}$ income	8153	7935	10062	8643
$\bar{X}$ number of people in household	4.5	4.3	3.7	3.9
$\bar{X}$ per person income	1992	1963	2845	2532
$\bar{X}$ mother's education	3.0	3.0	3.3	3.5
$\bar{X}$ mother's occupation	8.1	7.8	6.7	7.3

[a]Represent number of students in the groups, however the N for any one indicator may be less depending on the number with missing data.

*Differences between students enrolled and not enrolled statistically significant, $p < .05$.

0119g

TABLE C-7

Percentage of Missing Data for Head Start and Comparison Group in 1970-71 Cohort

Characteristic	N =	Head Start 458	Comparison 153
Sex		0	1
Race/ethnicity		14	29
Single parent family		5	30
Income		27	33
Number of people in household		1	12
Per person income		27	34
Mother's education		18	45
Mother's occupation		6	31

0119g

TABLE C-8

Percentage of Missing Data
for Head Start and Comparison Group
in 1974-75 Cohort

Characteristic	N =	Head Start 852	Comparison 314
Sex		1	6
Race/ethnicity		2	24
Single parent family		2	28
Income		4	20
Number of people in household		1	12
Per person income		5	21
Mother's education		12	27
Mother's occupation		3	18

TABLE C-9

Percentage of Missing Data
for Head Start and Comparison Group
in 1970-71 Cohort

Characteristic	Head Start N = 458	Comparison 153
Sex	0	1
Race/ethnicity	14	29
Single parent family	5	30
Income	27	33
Number of people in household	1	12
Per person income	27	34
Mother's education	18	45
Mother's occupation	6	31

APPENDIX D

THE EFFECT OF HEAD START ON THE HEAD START CLASS OF 1974-75

SUMMARY

For the eighth graders, the Head Start class of 1974-75, the Head Start graduates were statistically different from the comparison groups on only one measure: 33 percent of the Head Start graduates scored below the 40th percentile in fifth grade versus 48 percent of the other group. (These percentages were adjusted for demographic differences.) On a number of other measures, including retention, the percentage of low scorers at Grade 8 and the composite measure which was the percentage of students retained or in special education or who scored low, the Head Start graduates displayed better performance than the comparison group; but the difference was not large enough to be significant statistically.

A child who applied to Head Start in 1974-75 as a four year old and advanced a grade each subsequent year was in Grade 8 for school year 1983-84. The evaluation examined the Head Start graduates and the comparison group children with respect to their performance on the Grade 5 and Grade 8 California Achievement Tests, whether or not they had been retained in grade, and their need for special education services over the last four years (Grades 5 through 8).

THE STUDENTS BEING FOLLOWED

In 1974-75, 852 students were enrolled in the MCPS Head Start program for eight or more months. There were 314 other four year olds who applied but either never attended or attended for one month or less. Sixty-three percent of the Head Start graduates were still enrolled by fifth grade; 58 percent were enrolled at eighth grade. Only 44 percent of the comparison children were enrolled by fifth grade; 36 percent were enrolled at eighth grade. As with the 1978-79 cohort, the difference between the groups may have been the rate at which the two groups of children enrolled in MCPS initially. Many of the comparison group may have actually moved away prior to or during 1974-75 which is why they were never enrolled in Head Start to begin with. It is equally possible that many of the comparison group children enrolled in MCPS but withdrew prior to fifth grade. There is no way to decide between either of these hypotheses since we have no information on the children prior to fifth grade. The rate of departure for the two groups from year to year after Grade 5 appears similar. Appendix B contains more information about attrition.

The demographic data for the Head Start and comparison students were examined and are presented in detail in Appendix C. In 1974-75, the groups were very similar in their relative proportion of boys and girls. The differences between the two groups on the percentage of single parent families were not statistically significant although there were more children from single parent families in the Head Start group (27% for Head Start; 19% for the comparison group). The differences for all of the other indicators were statistically significant with the difference "favoring" the comparison group children. (The differences "favor" the comparison group

insofar as their values on the indicators are in the direction hypothesized in the literature to be related to greater school achievement.) The comparison group had significantly fewer minority children (44 percent of the Head Start group compared to 27 percent of the comparison group). The comparison group also had a higher mean family income, a higher mean per person income, and more highly educated mothers. By any number of indicators, the Head Start children were from families which were lower socioeconomically.

A comparison of the demographic characteristics of the students still enrolled in 1983-84 indicated that the groups used for the analyses (the remaining Head Start children versus the remaining comparison group) differed significantly on everything but the proportion of boys and girls. Again, the group of Head Start graduates still enrolled in 1983-84 were from socioeconomically lower families than the comparison children.

RESULTS OF STANDARDIZED ACHIEVEMENT TESTS

Analysis of the standardized tests for the two groups of children involved two comparisons:

- Head Start versus comparison students on the Grade 5 California Achievement Test
- Head Start versus comparison students on the Grade 8 California Achievement Test

Although the students were administered tests in Grade 3, these results were no longer available because the computer tape had been inadvertently destroyed.

Grade 5 Test Results

The results of the fifth grade California Achievement Tests for the 282 Head Start graduates and the 67 comparison students who took the test are presented in Table D-1. These results have been adjusted to correct for the demographic differences between the two groups. None of the differences between the groups were statistically significant, nor did any pattern emerge with one group consistently higher than the other. The largest difference was 4 NCE points on the Math Concepts and Applications subtest and the Math Total score, with the Head Start average being the higher. Table D-1 also presents the average scores for all the MCPS fifth graders who took the test. These scores have not been adjusted for demographic differences and are presented only as benchmark figures.

Grade 8 Test Results

Table D-2 presents the results for the students from each of the two groups who took the California Achievement Test in Grade 8. There were no statistically significant differences between the two groups. With the exception of one reading subtest and the Reading Total score, the Head Start mean score was numerically equal to or higher than the comparison group's for all tests examined. The largest difference, however, was only 3 NCE points.

TABLE D-1

Mean NCEs for Grade 5
California Achievement Test in 1980-81
(1974-75 Cohort)

	Head Start	Comparison
N =	282	67
Reading vocabulary	51	54
Reading comprehension	50	50
TOTAL READING	51	52
Spelling	52	54
Language mechanics	56	54
Language expression	52	51
TOTAL LANGUAGE	54	53
Math computation	53	52
Math concepts and applications	54	50
TOTAL MATHEMATICS	54	50
TOTAL BATTERY	53	52

Note: Head Start and comparison group scores have been adjusted for demographic differences.

TABLE D-2

Mean NCEs for Grade 8
California Achievement Test in 1983-84
(1974-75 Cohort)

	Head Start	Comparison
N =	262	65
Reading vocabulary	50	53
Reading comprehension	54	54
TOTAL READING	52	54
Spelling	52	51
Language mechanics	57	55
Language expression	53	50
TOTAL LANGUAGE	55	52
Math computation	56	56
Math concepts and applications	58	55
TOTAL MATHEMATICS	58	56
TOTAL BATTERY	55	54

Note: Head Start and comparison group scores have been adjusted for demographic differences.

ACADEMIC SUCCESS

Academic success was defined as scoring above the 80th percentile on a standardized achievement test. Table D-3 presents the adjusted percentages of Head Start and comparison students who were classified as "academic successes" based on their scores on the California Achievement Test results in Grade 5 and Grade 8. The last row of figures presented in the table are the percentage of students who scored above the 80th percentile on both the Grade 5 and Grade 8 tests. There were no statistically significant differences between the groups although the comparison group had a higher percentage of academic successes.

ACADEMIC DIFFICULTY

The percentages of students who had each of the various indicators of academic difficulty are shown in Table D-4 (see Appendix A for more information about these measures.) Nineteen percent of the Head Start graduates had been retained by eighth grade versus 21 percent of the comparison children. Fourteen percent of the Head Start children had been in a special class or school compared to 13 percent of the comparison students. One-third of the Head Start graduates had scored below the 40th percentile on the California Achievement Test in fifth grade; the corresponding figure for the comparison group was 48 percent. This difference was statistically significant ($p < .05$). The percentages of students below the 40th percentile at Grade 8 was 29 and 35 for the Head Start and comparison groups, respectively, which was not significant. Roughly half of the the Head Start and comparison students (49% and 54%, respectively) had been retained or in a special class or had a Total Grade 8 California score below the 40th percentile.

While almost all the measures of difficulty favored the Head Start group, for only one--the percentage of students below the 40th percentile on the California at Grade 5--was the difference statistically significant. It should be pointed out that given the small sample size for the comparison group, the difference between the groups had to be very large for it to be statistically significant. On this measure, the difference between the Head Start and comparison groups was 15 percentage points. Overall, for the measures of difficulty, the largest differences were found on the measures involving the standardized tests. This difference was further reflected in the composite variable.

TABLE D-3

Percentage of Academic Successes[a]
(1974-75 Cohort)

	Head Start %	Comparison %
Total, California Achievement Test, Grade 5	19 (N=282)	24 (N=67)
Total, California Achievement Test, Grade 8	22 (N=261)	26 (N=65)
Both, Grade 5 and Grade 8[b]	18 (N=247)	24 (N=63)

Note: Head Start and comparison group scores have been adjusted for demographic difference.

a. Academic success was defined as scoring above the 80th percentile.
b. Above 80 percentile on both tests.

TABLE D-4

Percentages With Academic Difficulty
(1974-75 Cohort)

	Head Start %	Comparison %
Retained	19 (N=334)	21 (N=78)
In Level 4 or more special education	14 (N=389)	13 (N=83)
Retained or in Level 4 or more special	30 (N=289)	31 (N=83)
Below 40th percentile, Total Battery, Grade 5, California Achievement Test	33 (N=282)	48* (N=67)
Below 40th percentile, Total Battery, Grade 8, California Achievement Test	29 (N=261)	35 (N=65)
Below 40th percentile, Grade 5 and Grade 8	22 (N=247)	29 (N=63)
Retained or in Level 4 or more special education or below 40th percentile, Grade 8	49 (N=372)	54 (N=81)

Note: Only students enrolled continuously for the last four years are included. Percentages were computed only on students who did not have missing data for a category. Head Start and comparison group percentages have been adjusted for demographic differences.

*p <.05

APPENDIX E

THE EFFECT OF HEAD START ON THE HEAD START CLASS OF 1978-79

SUMMARY

The analysis of outcomes for students who applied to Head Start in 1978-79 showed only one statistically significant difference between students who attended and those who did not attend the program: the Head Start group had a higher adjusted percentage of students who scored above the 80th percentile on one of the subtests of the Cognitive Abilities Test administered in third grade. The Head Start group also had a higher percentage of high scorers on the Total score of the California Achievement Test and the other two subtests of the Cognitive Abilities Test along with higher average scores on all subtests of both tests and fewer children below grade level. These differences, however, were not statistically significant.

A child who applied to Head Start in 1978-79 as a four year old and advanced a grade each subsequent year was in fourth grade for school year 1983-84. The evaluation examined the Head Start graduates and the comparison group children with respect to their performance on the Grade 3 California Achievement Tests and the Cognitive Abilities Test, whether or not they had been retained in grade, and their need for special education services over the last four years (Grades 1 through 4).

THE STUDENTS BEING FOLLOWED

In 1978-79, 605 students attended the MCPS Head Start Program for eight or more months. There were 152 other four year olds who applied but either never attended or attended for one month or less. Eighty-two percent of the Head Start graduates were still enrolled at first grade; 72 percent were enrolled at fourth grade. Only 48 percent of the comparison children were enrolled for first grade; 41 percent were enrolled at fourth grade. The difference between the groups appears to be the rate at which they enrolled in MCPS initially. Many of the comparison group may have actually moved away prior to or during 1978-79 which is why they were never enrolled in Head Start to begin with. The rate of departure for the two groups from year to year after kindergarten appears similar. Appendix B contains more information about attrition.

The demographic data for the Head Start and comparison students were examined and are presented in detail in Appendix C. In 1978-79, the groups were very similar in their percentage of males and minorities. They differed numerically on all of the other indicators although this difference was only statistically significant for number of people in the household. The differences "favor" the comparison group; their values on the indicators are in the direction hypothesized in the literature to be related to greater school achievement, that is, their families have higher incomes, their mothers have more education, etc. While both groups would be considered to be low socioeconomically, the Head Start group was lower.

A comparison of the demographic characteristics of the students still enrolled in 1983-84 indicate that the groups used for the analyses (the remaining Head Start children versus the remaining comparison group) did not

deviate radically from their respective original groups although there are some differences. The 411 Head Start graduates (68%) who were still here had a higher average family income; the mean income for the Head Start graduates who left the system was $7,936 compared to $8,153 for those who were still here. This difference was not statistically significant. The corresponding figures for the comparison group were $8,643 for the children who were no longer here compared to $10,063 for those who were still here. With regard to family income, the difference between the Head Start and the comparison students was larger then that between the original groups. Additional information is presented in Appendix C.

RESULTS OF STANDARDIZED ACHIEVEMENT TESTS

The California Achievement Tests and the Cognitive Abilities Test were administered systemwide to third graders in 1982-83. The results for each of the subtests and the totals for the California Achievement Tests are presented in Table E-1. The California Achievement Tests are administered in the fall. The scores for the Head Start and comparison groups have been adjusted through analysis of covariance to account for the demographic differences between the groups. Table E-1 also presents the average scores for all the MCPS third graders who took the test. These scores have not been adjusted for demographic differences and are presented only as benchmark figures.

Numerically, the average score for the Head Start graduates was higher than that of the comparison group for nearly all of the subtests including the three Total scores and the Total Battery Score. However, none of the differences were statistically significant. The largest difference was 7 NCE points for Reading Vocabulary ($p = .06$). The county averages indicate that the Head Start and the comparison group scored about one-half of a standard deviation below the more than 5000 MCPS third graders who took the test.

The Cognitive Abilities Test was administered in the spring of third grade. The average scores in NCE points are shown in Table E-2. Again the Head Start group outscored the comparison group on each of the three parts of the test but again none of the differences were statistically significant. The largest difference was in the Nonverbal score, a difference of 9 NCE points ($p = .06$).

ACADEMIC SUCCESS

To provide a broader picture of how the two groups of children were performing in school, other indicators of academic success and difficulty in addition to average test scores were examined. This approach included defining "academic success" and "academic difficulty" as high and low scorers on the achievement test. Only students enrolled continuously for the last four years were included in these analyses.

Academic success was defined as scoring above the 80th percentile on a standardized achievement test. Table E-3 presents the adjusted percentages of Head Start and comparison students who were classified as "academic successes" based on their scores on the California Achievement Tests and the

TABLE E-1

Mean NCEs for Grade 3
California Achievement Test In 1982-83
(1978-79 Cohort)

	Head Start	Comparison
N =	217	24
Phonics analysis	51	51
Structural analysis	57	58
Reading vocabulary	52	45
TOTAL READING	54	50
Spelling	55	54
Language mechanics	62	57
Language expression	57	53
TOTAL LANGUAGE	59	55
Math computation	55	58
Math concepts and applications	56	52
TOTAL MATHEMATICS	56	55
TOTAL BATTERY	56	53

Note: Head Start and comparison group scores have been adjusted for demographic differences.

TABLE E-2

Mean NCEs for Grade 3 Cognitive Abilities Test in 1982-83
(19978-79 Cohort)

	Head Start	Comparison
N =	217	24
Verbal	58	52
Quantitative	62	55
Nonverbal	60	51

Note: Head Start and comparison scores have been adjusted for demographic differences.

TABLE E-3

Percentage of Academic Successes
(1978-79 Cohort)

	Head Start	Comparison
N =	217	24
Total California Achievement	25	15
Cognitive Abilities		
Verbal	29	-2*[a]
Quantitative	38	21
Nonverbal	32	17

Note: Head Start and comparison group scores have been adjusted for demographic differences.

a. Adjustment for demographic differences took percentage below 0.

*p <.01.

Cognitive Abilities Test. All of the comparisons favored the Head Start group. Twenty-five percent of the Head Start graduates and 15 percent of the comparison students were "successes" on the California Achievement Tests. This difference was not significantly significant even though it was a difference of 10 percentage points. This difference was due in part to the fact that 8 (of the 217) Head Start graduates had Total scores at the 99th percentile. One of the differences, between the percentages of high scoring students on the Cognitive Abilities Test was statistically significant; there was a difference of 31 percentage points on the Verbal test ($p = .01$). The difference on the other two parts of the test was sizable but not statistically significant.

ACADEMIC DIFFICULTY

To examine the frequency of academic difficulty, the evaluation looked at the percentage of children who had been retained and the percentage of children who had been in Level 4 or more special education within the last four years (Level 4 or more special education would be a student who had been placed in a special class or a special school). A third measure of academic difficulty was the percentage of students who scored below the 40th percentile on the Total score of the California Achievement Test. A composite measure was also calculated.

The percentages of students who had each of the various indicators of difficulty are shown in Table E-4. Twenty-five percent of the Head Start graduates had been retained by fourth grade compared to 27 percent of the comparison children. Ten percent of the Head Start children had been in a special class or school compared to 8 percent of the comparison students. Over half the Head Start and comparison students (53% and 54%, respectively) had been retained or in a special class or had a Total California score below the 40th percentile. None of the differences between the Head Start and comparison groups were statistically significant.

TABLE E-4

Percentages With Academic Difficulty
(1978-79 Cohort)

	Head Start %	Comparison %
Retained	25 (N=287)	27 (N=31)
In Level 4 or more special education	10 (N=323)	8 (N=33)
Retained or in Level 4 or more special education	33 (N=323)	34 (N=33)
Below 40th percentile, Total Battery, Grade 3 California Achievement Test	33 (N=217)	32 (N=24)
Retained or in Level 4 or more special education or below 40th percentile, Grade 3	53 (N=314)	54 (N=33)

Note: Only students enrolled continuously for the last four years are included. Percentages were computed only on students who did not have missing data for a category. Head Start and comparison group percentages have been adjusted for demographic differences.

*p <.05.

APPENDIX F

DIFFERENCES BY RACIAL/ETHNIC GROUP AND SEX FOR STUDENTS BORN IN 1970 AND 1974

The differences in outcomes for the Head Start and other MCPS students born in 1966 were analyzed by racial/ethnic group and sex and presented in Chapter 5. Appendix F presents similar analyses for the students born in 1970 and 1974. Additional information about the analyses and the measures used is available in Chapter 5 and Appendix A.

FINDINGS FOR BIRTH YEAR 1970 (GRADE 8)

Differences by Ethnicity/Race

Table F-1 presents the four outcome measures for the students born in 1970, the eighth graders of 1983-84. The percentage with difficulty is graphed in Figure F-1. The percentage minority to percentage majority students is graphed in Figure F-2.

Head Start Students. Roughly the same proportion of black, whites, and Hispanic Head Start graduates had been retained in grade. Twice as many blacks as whites had been placed in special education. The black students also had the highest relative proportion of low scorers on the California Achievement Tests (CAT), 42 percent, compared to 25 percent for the majority students, 17 percent for the Hispanics, and 0 for the Asians. As measured by the composite variable, the black students had the highest rate of academic difficulty. By Grade 8, 66 percent of the black Head Start graduates had been retained, been in special education, or had low scores on the CAT. The corresponding figures for white and Hispanic students were 48 and 47 percent.

Other MCPS Students. Overall, for the non-Head Start students, the blacks and Hispanics had experienced the highest rate of difficulty. Twenty-nine percent of the Hispanic students were in an inappropriate grade placement as were 21 percent of the Asians. The high Asian percentage is unusual in that it is inconsistent with the other indicators and with the data for the students born in 1974. One probable explanation is that many of these students may have been new to the country several years earlier (at least four) and were placed on a grade by factors other than their age. This hypothesis may also explain why some of the Hispanic students were in grades below their appropriate grade level.

The black students had the highest proportion of special education placements with twice as many as the white students and over three times as many as the Asians and Hispanics. The black students also had by far the highest proportion of students with low scores on the CAT with 21 percent which was also over three times that of the white students (6%). The corresponding figure for the Hispanics was 9 percent and for the Asians 4 percent. The data for the composite measure showed that 40 percent of the black students and 38 percent of the Hispanics had experienced difficulty as measured by one of the other three outcome measures. The minority-majority ratio for both blacks and Hispanics was about two to one.

TABLE F-1

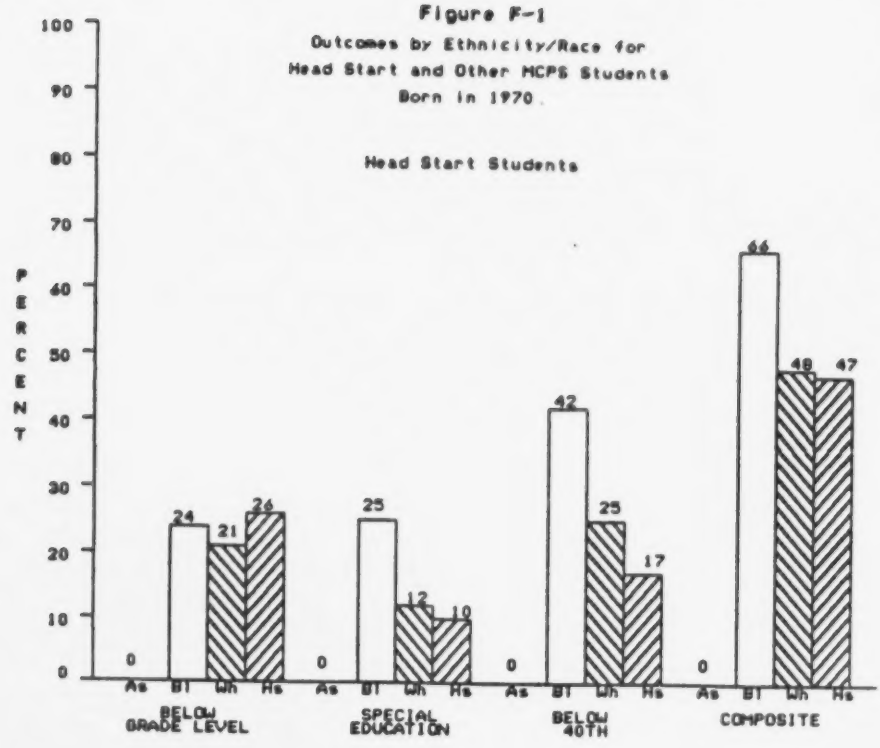
Outcomes by Ethnicity/Race for Head Start Students (1974-75) and Other MCPS Students Born in 1970

	Inappropriate Grade Placement				Special Education				Below 40th California Test[a]				Composite			
	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs
Head Start																
Percentage	0	24	21	26	0	25	12	10	0	42	17	0	0	66	48	47
Total Number	10	148	210	19	10	192	236	21	10	111	159	12	10	183	224	19
Other MCPS																
Percentage	21	16	11	29	3	10	5	3	4	21	6	9	28	40	21	38
Total Nunmber	377	540	4503	158	385	592	4700	162	271	419	3750	102	358	553	4405	150

a. Grade 8

Figure F-1

Outcomes by Ethnicity/Race for
Head Start and Other MCPS Students
Born in 1970



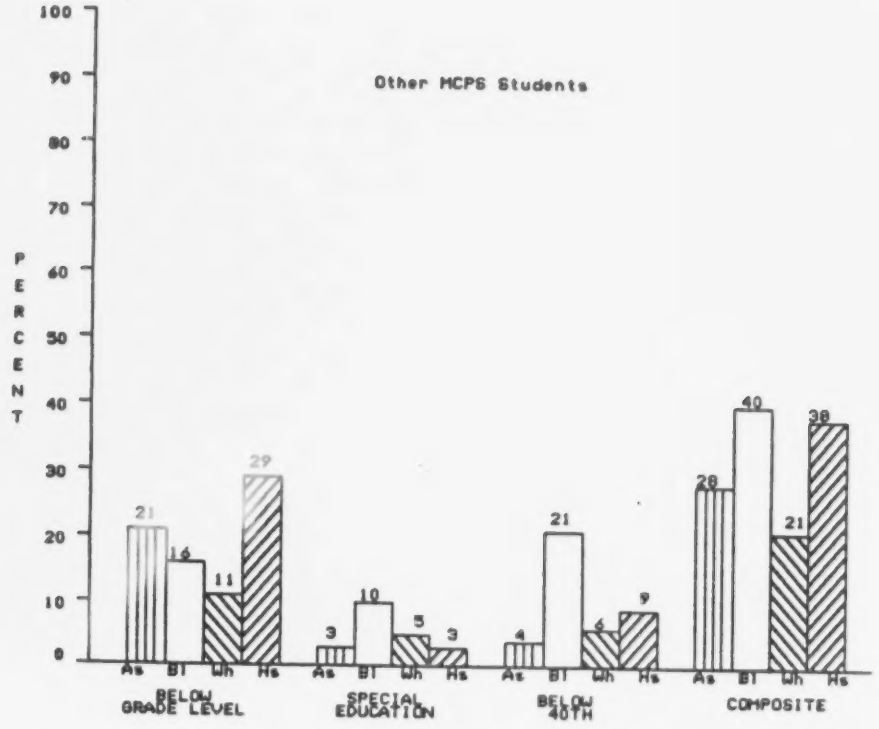
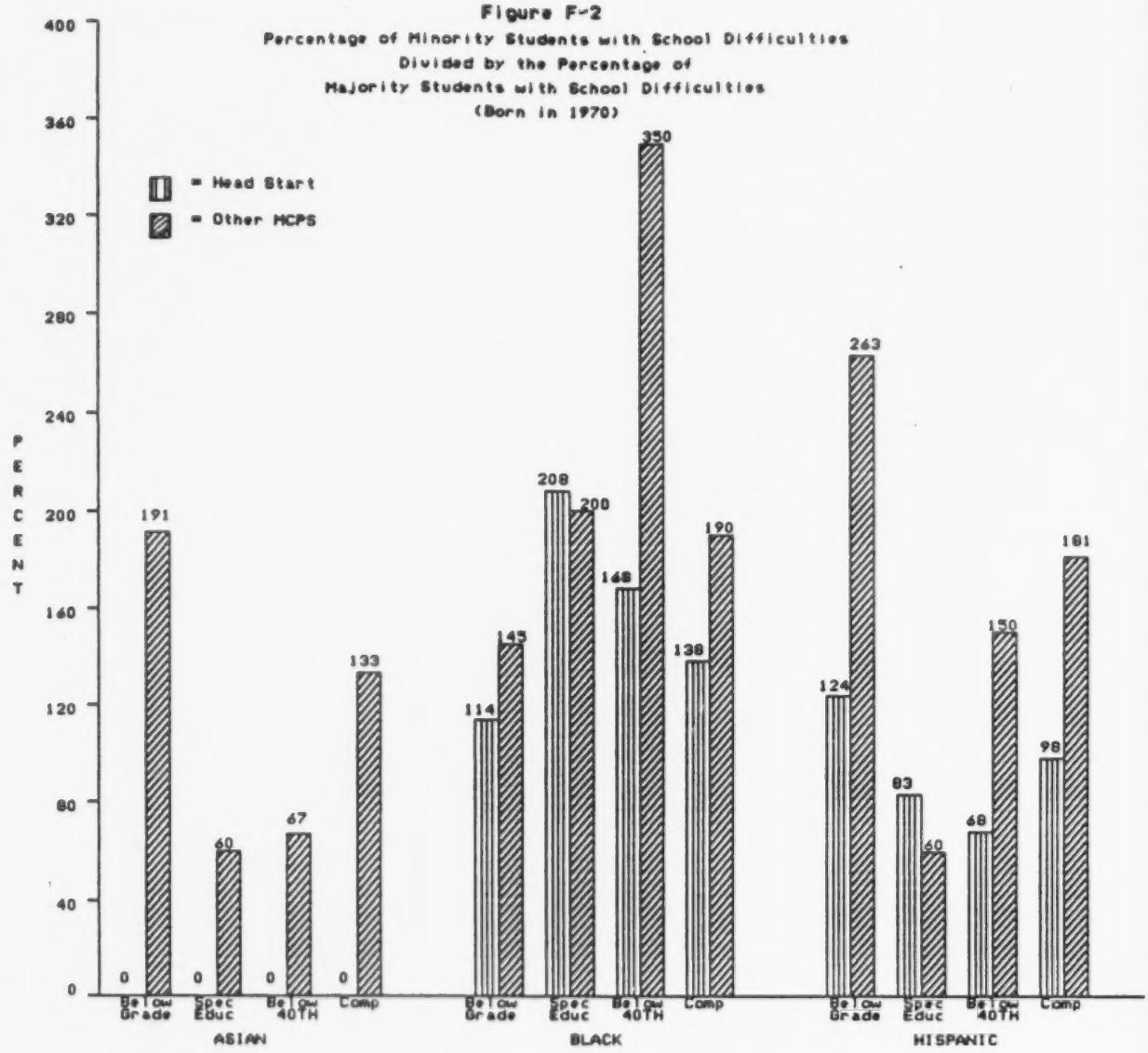


Figure F-2

Percentage of Minority Students with School Difficulties
Divided by the Percentage of
Majority Students with School Difficulties
(Born in 1970)



Comparison of Head Start with Other MCPS. The measures of racial difference which are graphed in Figure F-3 show that the minority-majority differences are greater in the general MCPS population than in the Head Start population. For the black students, the black-majority ratio was greater for the other MCPS students for the inappropriate grade level measure, the CAT, and the composite measure. The difference was especially large on the CAT. The black to majority figure for the Head Start graduates was 168 percent; for the other MCPS students, it was 350 percent. The same pattern held for the Hispanic students. On all but the special education indicator, there was more of a minority-majority difference for the other MCPS students than for the Head Start graduates.

Differences by Sex

The percentages of males and females born in 1970 who had school difficulty are presented in Table F-2. These data are graphed in Figure F-4. Figure F-5 presents the percentage of males with difficulty divided by the percentage of females with difficulty.

Head Start Students. The male Head Start graduates had more students below grade level and in special education, but the female students had a larger percentage of low scorers on the CAT. The differences between the males and females was greatest with regard to special education; over three times as many males as females had been placed in special classes (25% to 8%). Fifty-eight percent of the male Head Start graduates had experienced one of the three types of academic difficulty. The corresponding figure for females was 50 percent.

Other MCPS Students. For the rest of the MCPS students, the males had a higher percentage of school difficulties regardless of the measure examined. Nearly twice as many males as females were in an inappropriate grade placement (16% to 9%). The difference for special education was even larger, with 8 percent of the males being in special classes compared to 3 percent of the females. Twenty-nine percent of the males had experienced some type of academic difficulty compared to 18 percent of the females.

Comparison of Head Start Students and Other MCPS Students. The extent of the differences between males and females did not vary a great deal between the Head Start and non-Head Start students. For both groups, the male students performed more poorly than the females. For special education, the difference between the males and females was greater for the Head Start students. For the other three measures, the difference was larger for other MCPS students.

Differences by Race by Sex

Among the Head Start graduates, the Hispanic females had the highest proportion of students below grade level (33%). The black males had the largest percentage of students in special education with 34 percent. The black females had the largest percentage of low scorers on the CAT (48%). As measured by the composite measure, 67 percent of the black males, 64 percent of the black females, 53 percent of the white males, and 50 percent of the Hispanic males had experienced some type of academic difficulty. The figures for the other groups were all lower.

Figure F-3
Outcomes by Sex for
Head Start and Other MCPS Students
Born in 1970

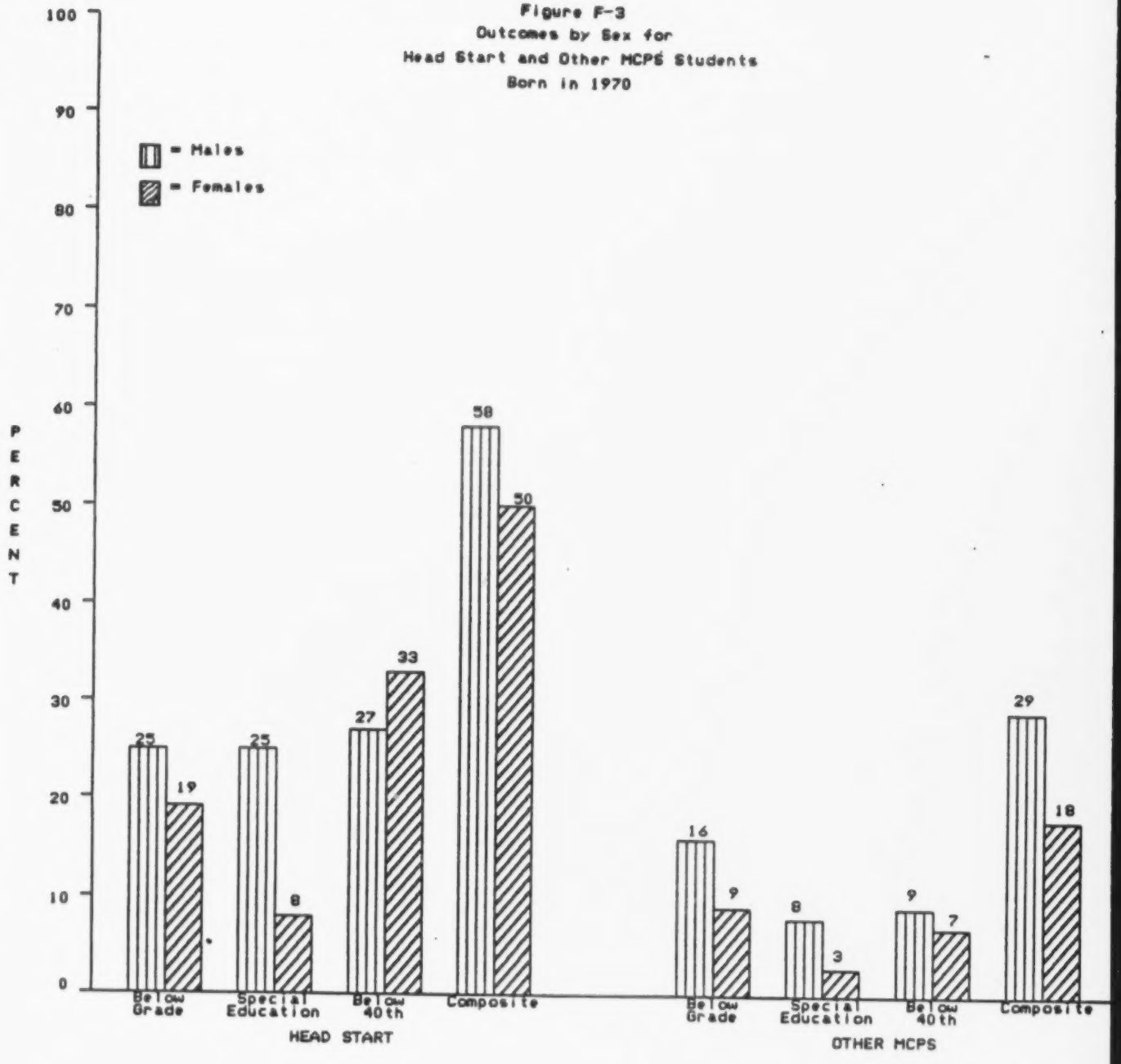


TABLE F-2

Outcome by Sex for Head Start Students (1974-75)
and Other MCPS Students Born in 1970

	Inappropriate Grade Placement		Special Education		Below 40th California Test[a]		Composite	
	Male	Female	Male	Female	Male	Female	Male	Female
Head Start								
Percentage	25	19	25	8	27	33	58	50
Total Number	183	205	239	221	134	159	227	210
Other MCPS								
Percentage	16	9	8	3	9	7	29	18
Total Number	2803	2781	2992	2855	2220	2327	2828	2646

a. Grade 8

Figure F-4
Percentage of Males with School Difficulties
Divided by the Percentage of
Females with School Difficulties
(Born in 1970)

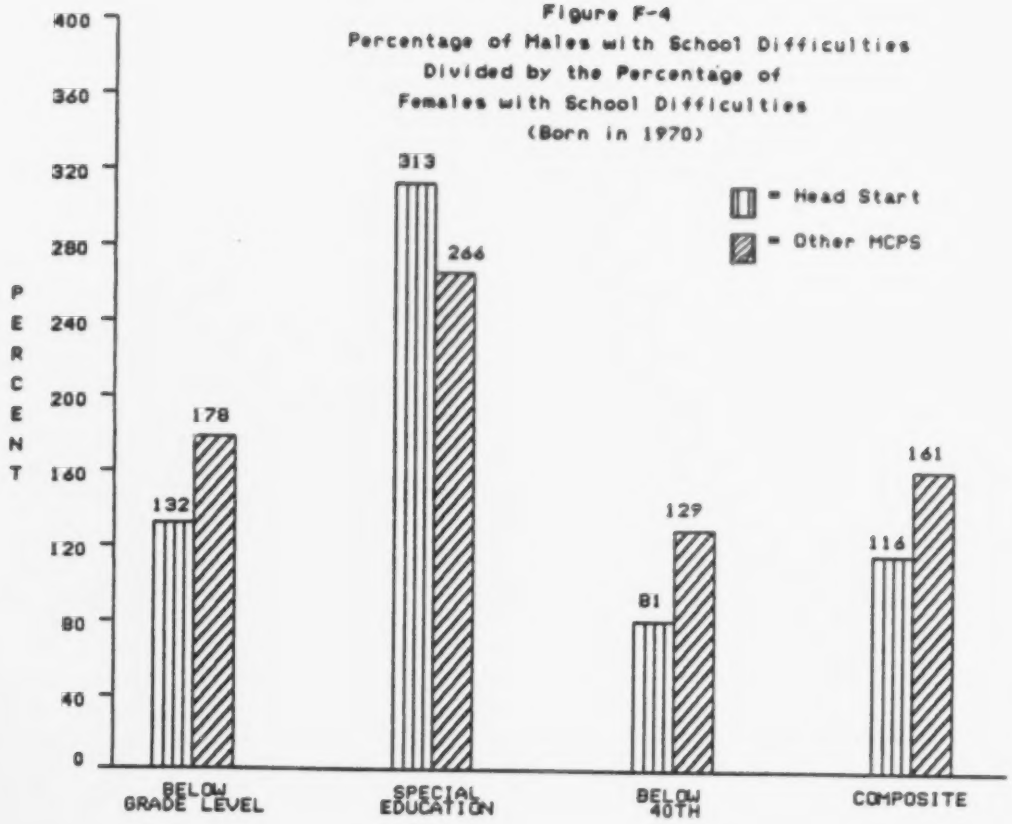
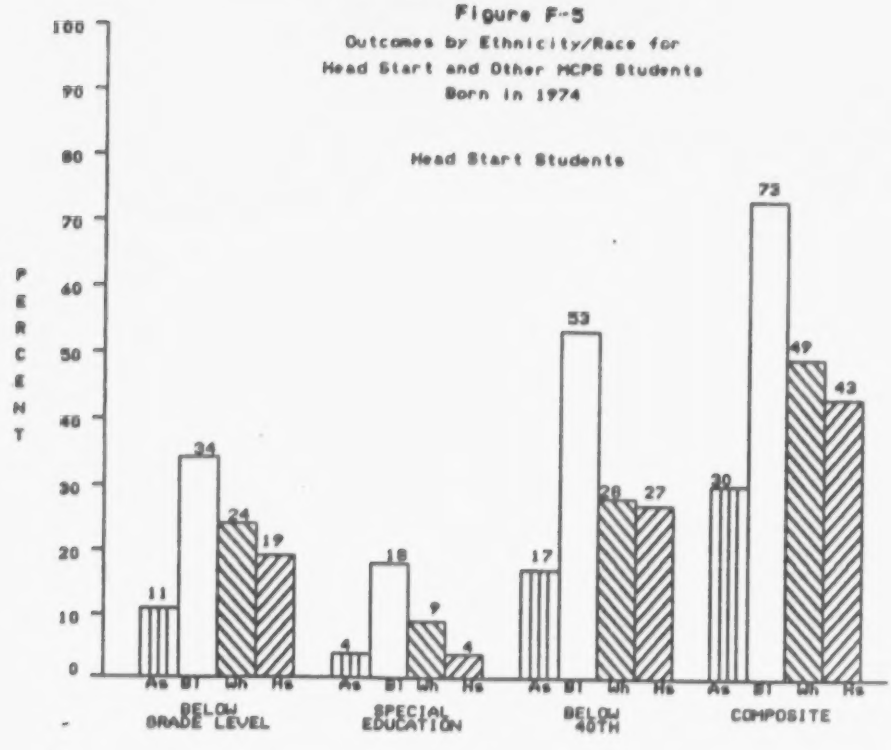
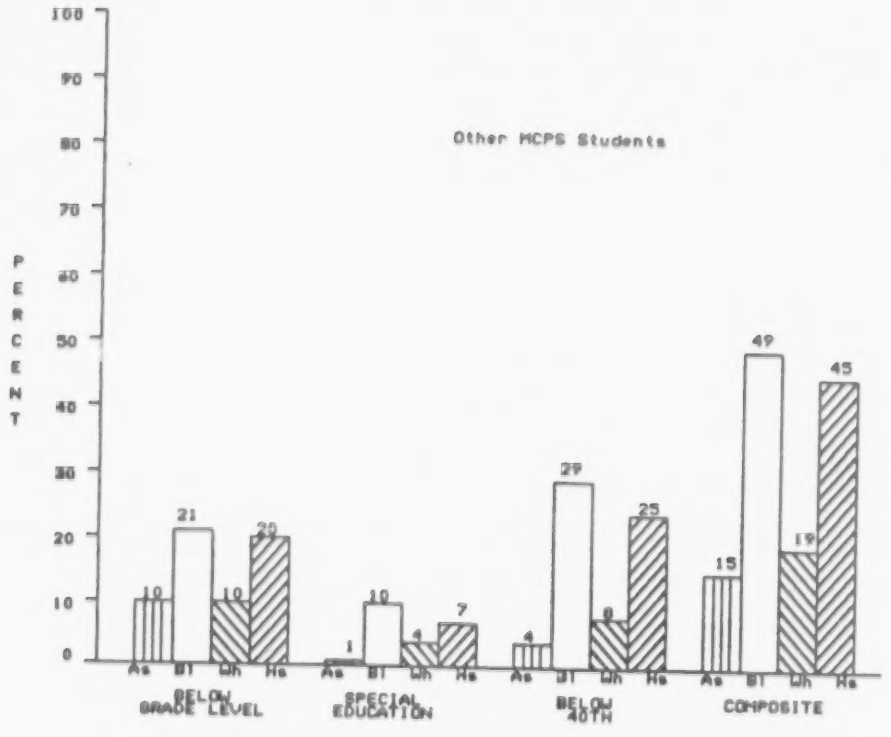


Figure F-5

Outcomes by Ethnicity/Race for
Head Start and Other MCPS Students
Born in 1974





Among the other MCPS students, 35 percent of the Hispanic males were in an inappropriate grade placement which was by far the largest percentage of the groups. The next largest were the Hispanic females (23%) and the Asian males (23%). Grade placement after transfer may have been responsible for these figures rather than an actual retention. The black males had the highest proportion of students in special education. The percentage of black males in special classes was 14 percent, followed by 7 percent for the white males, and 6 percent for the black females. As measured by the CAT, the groups with the most problems were the black males (22% scored below the 40th percentile), the black females (19%), and the Hispanic males (13%). On the composite measure, the same three groups had the highest percentages. Forty-six percent of the Hispanic males, 45 percent of the black males, and 36 percent of the black females were below grade, had been in special education, or had scored low on the CAT.

The same three groups have experienced proportionately more problems both within the Head Start population and within the population of other MCPS students. The message across all measures indicates that the black males, black females, and Hispanic males are experiencing a disproportionate number of school problems.

FINDINGS FOR BIRTH YEAR 1974 (GRADE 4)

Differences by Racial/Ethnic Group

Table F-3 presents the data for the four outcome measures for Head Start graduates and the other MCPS students who were born in 1974. These data are graphed in Figure F-5. The racial difference measure or percentage minority/percentage majority calculations are graphed in Figure F-6 for the Head Start and the other MCPS students.

Head Start Students. Within the population of Head Start graduates, 34 percent of the black students were below grade level which was the highest percentage of any of the groups. The ratio of blacks to majority students below grade level was 34:24 or a racial difference measure of 141 percent. The Asians had the fewest students retained with 11 percent below grade level or a racial difference measure of 46 percent.

Blacks also had the highest proportion of students in special education with 18 percent compared to 9 percent for the white students and 4 percent for both the Hispanic and the Asian students. The relative proportion of black to whites in special education was 200 percent. The figure for both the other two minority groups was 44 percent.

The pattern on the CAT was very similar to that seen with the previous two outcome measures. The blacks had the highest proportion of students scoring below the 40th percentile (53%). They were followed by the whites with 28 percent, the Hispanics with 27 percent, and the Asians with 17 percent. The black-majority difference measure was 189 percent, compared to the Asian figure of 61 percent.

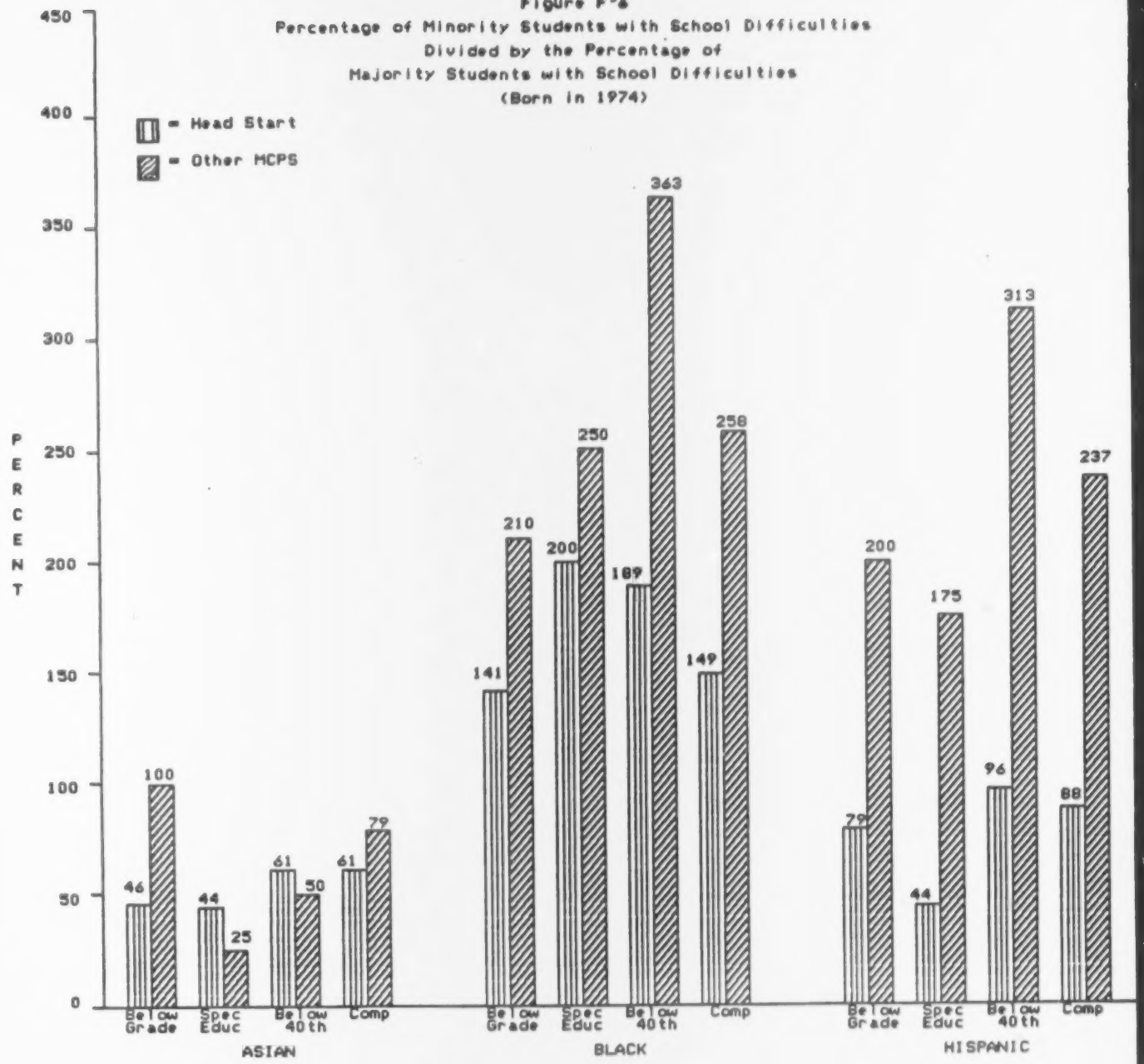
TABLE F-3

Outcomes by Ethnicity/Race for Head Start Students (1978-79)
and Other MCPS Students Born in 1974

	Inappropriate Grade Placement				Special Education				Below 40th California Test[a]				Composite			
	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs	As	Bl	Wh	Hs
Head Start																
Percentage	11	34	24	19	4	18	9	4	17	53	28	27	30	73	49	43
Total Number	27	113	194	27	28	136	217	28	23	74	152	22	27	131	212	28
Other MCPS																
Percentage	10	21	10	20	1	10	4	7	4	29	8	25	15	49	19	45
Total Number	300	341	2914	124	303	380	3024	131	249	266	2592	89	281	364	2954	121

a. Grade 3

Figure F-6
Percentage of Minority Students with School Difficulties
Divided by the Percentage of
Majority Students with School Difficulties
(Born in 1974)



The composite variable reflects the cumulative trends seen with the other three measures. The black students had by far the highest proportion of students who had experienced some type of school difficulty. By fourth grade, three-fourths of the black Head Start graduates had been retained, been in a special class, or had scored below the 40th percentile on the previous year's CAT. The figure for white students was 49 percent for a black-majority difference measure of 151 percent. The Hispanic and Asians had proportionately fewer students who had had school difficulties with 43 and 30 percent, respectively.

Other MCPS Students. The pattern of the data for the other MCPS students was similar to that of the Head Start graduates insofar as the black students had the highest percentage of students with difficulties on each of the measures and on the composite. Unlike their Head Start peers, the Hispanic students were consistently in second place with considerably more school difficulties than the majority students. The Asians had the same percentage of students in an inappropriate grade placement as the majority students and fewer students with problems as measured by the other three indicators.

The minority-majority relative proportions reflect the extremely different outcomes for black, Hispanic and majority students in the non-Head Start population (see Figure F-6). Twice as many blacks and Hispanic were below grade level, over twice as many blacks and nearly twice as many Hispanics had been in special education, and three times as many blacks and Hispanic had scored below the 40th percentile on the CAT.

Comparison of Head Start to Other MCPS. While there were racial/ethnic differences within the Head Start graduates, these differences were not nearly as large as those for the other MCPS students as Figure F-6 illustrates. On the composite variable, the black-majority racial difference measure for the Head Start students was 149 percent; for the other MCPS students, it was 258 percent. The differences were even more extreme for the Hispanic students because the Hispanic Head Start graduates had had fewer problems than the majority Head Start graduates. The racial difference measure for the Head Start Hispanic students was 88 percent compared to 237 percent for the Hispanic students who had not been to Head Start.

Differences by Sex

The percentages of males and females who had experienced each type of school difficulty are shown in Table F-4 and graphed in Figure F-7. Figure F-8 shows the difference between the males and females defined as the ratio of the percentage of males with problems to the percentage of females with problems.

Head Start Students. The differences between the males and female students were small within the Head Start population although on all measures the males had a higher percentage of students who had experienced school difficulty. The male-to-female percentage ranged from 108 for the Head Start students below grade level to 188 for special education. As measured by the composite variable, 59 percent of the male Head Start graduates had experienced some type of school difficulty compared to 51 percent of the females. The male-to-female percentage for the composite variable was 116.

TABLE F-4

Outcome by Sex for Head Start Students (1978-79)
and Other MCPS Students Born in 1974

	Inappropriate Grade Placement		Special Education		Below 40th California Test[a]		Composite	
	Male	Female	Male	Female	Male	Female	Male	Female
Head Start								
Percentage	27	25	15	8	37	31	59	51
Total Number	188	174	221	189	140	132	214	185
Other MCPS								
Percentage	15	8	5	3	12	8	28	17
Total Number	1834	1848	1940	1901	1538	1661	1882	1841

a. Grade 3

Figure F-7
Outcomes by Sex for
Head Start and Other MCPS Students
Born in 1974

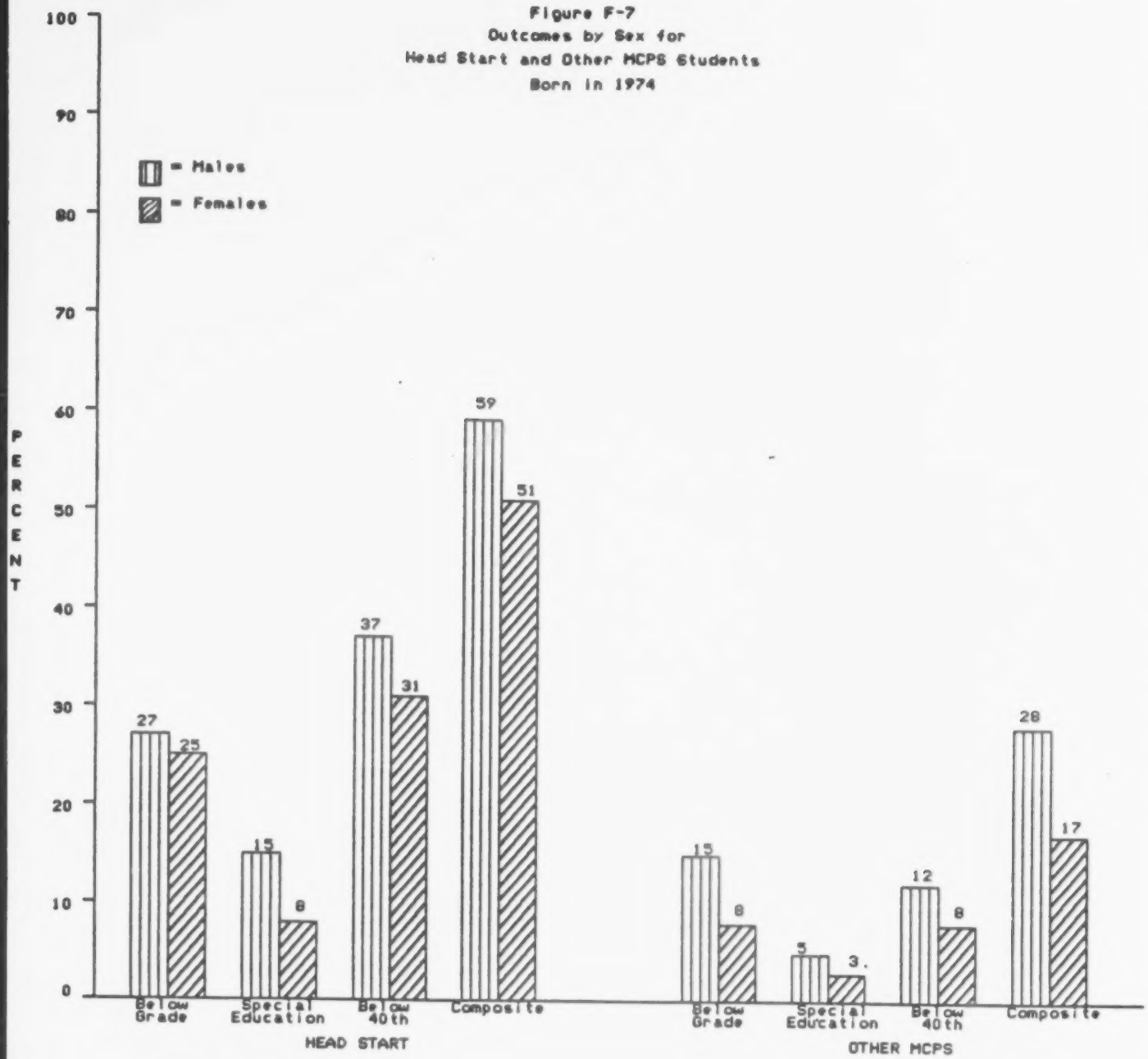
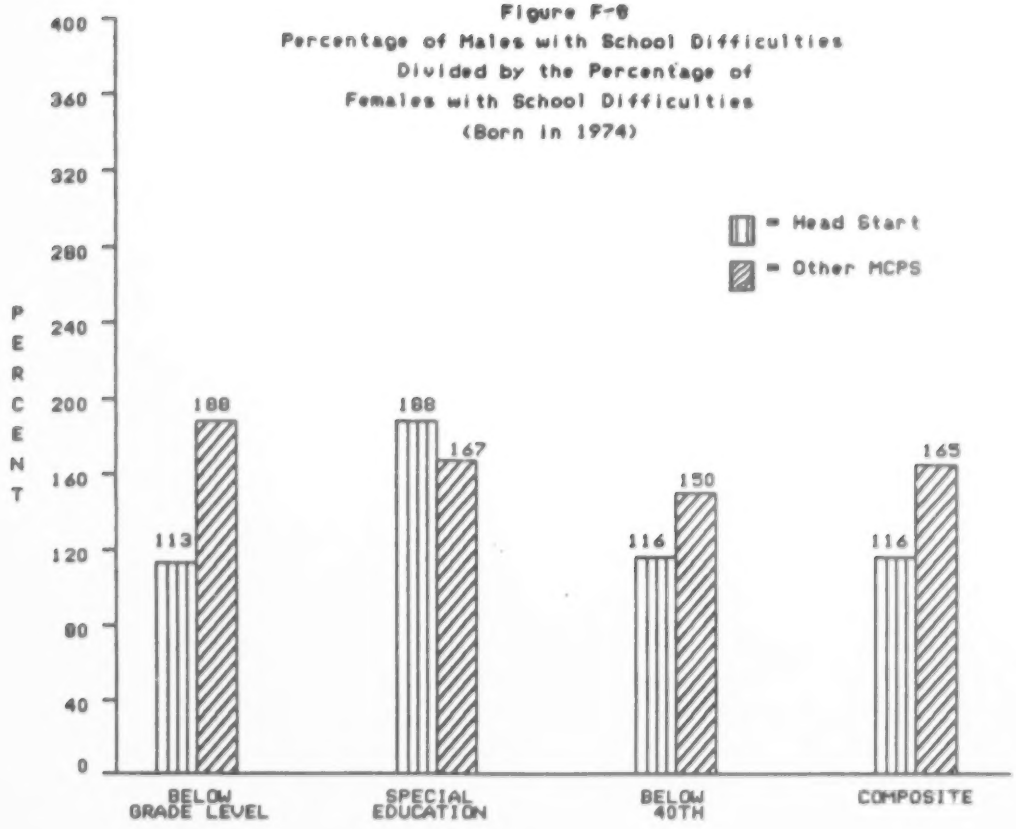


Figure F-8
Percentage of Males with School Difficulties
Divided by the Percentage of
Females with School Difficulties
(Born in 1974)



Other MCPS Students. The pattern for the other MCPS students paralleled that seen with the former Head Start students; on all measures, the males had the higher percentage of students with difficulty. The largest difference between the males and females was on the below grade level measure. Nearly twice as many males as females were not yet in fourth grade. This could possibly be due to parents starting boys in kindergarten later than girls. The smallest difference was seen on the Grade 3 CAT where the male-to-female figure was 150 percent.

Comparison of Head Start and Other MCPS Students. For both groups, the the males experienced more problems than the females regardless of the measure being examined. Except for placement in special education, the difference between the males and females was less for the Head Start population than for the other MCPS students.

Differences by Race and Sex

For the Head Start students, the black females had the highest percentage of students below grade level (35%), followed closely by the black males with 32 percent. The black males had the largest percentage of students in special education with 27 percent. The three groups with the highest percentage of low scorers on the CAT were the black males (56%), the Hispanic males (50%), and the black females (50%). Overall, the black males had experienced the most school difficulty. By fourth grade, 78 percent of the black males who had attended Head Start had either been retained, been in special education, or had scored below the 40th percentile on their third grade CAT. The next groups with the poorest performance were the black females, 68 percent of whom had some kind of difficulty, and the Hispanic males for whom the figure was 62 percent.

For the other MCPS students, the overall pattern of data was similar to that of the Head Start graduates in that the black males and females and the Hispanic males had the most school problems. About one-third of the Hispanic males were in an inappropriate grade placement as were 24 percent of the black males and 19 percent of the black females. The percentages of black and Hispanic males in special education were nearly identical, with 13 and 12 percent, respectively. They were followed by the black females with 7 percent and the white males with 5 percent. On the Grade 3 CAT, 33 percent of the Hispanic males had scored below the 40th percentile as had 30 percent of the black males and 29 percent of the black females. The data for the composite measure showed that the Hispanic males had the most problems overall. By fourth grade, 59 percent of the Hispanic males had some kind of school difficulty. The corresponding figures for black males and females, the next highest two groups, were 53 and 45 percent, respectively.

The pattern in the data for the Head Start and other MCPS students was similar. In both sets of data, the black males, black females, and Hispanic males had more problems than the other groups. The differences between these groups and their majority counterparts were considerably greater in the non-Head Start population.

APPENDIX G

THE EFFECT OF MULTIPLE COVARIATES

The statistical technique described in Chapter 2 and used with the data reported in Chapter 3 was analysis of covariance. Each of the dependent measures in Chapter 3 was analyzed using two factors and six covariates. They were:

Factors	Covariates
Sex	Mother's education
Race/Ethnicity	Income
	Per person income
	Number of people in the household
	Single parent
	Mother's occupation

One possible problem with this type of analysis is the effect of using multiple covariates. Use of one covariate will tend to undercorrect for the differences between the groups; however, it is not always clear what the direction of the bias is when multiple covariates are used (Reichardt, 1979). As explained in Chapter 2, the rationale for using multiple covariates was the need to account for pre-existing differences in the groups. In the absence of a measure of child performance prior to Head Start, the best proxy measure was the demographic data. The six demographic indicators were used because each had the potential to contribute unique information about the child. In actuality, for any given dependent measure, usually one or two of the covariates was related to the measure and the others had no relationship.

To examine the effect of using six covariates in all of the analyses, several experimental analyses were performed. Four of the dependent measures were selected, and then the analysis was performed using different combinations of factors and covariates. The adjusted data under different combinations of factors and covariates are shown in Table G-1. In general, the results showed that the findings presented in the report could have been obtained with a much smaller set of covariates, sometimes even one or two, but that using all six did not appear to have any unusual effect on the findings. The covariates which were not related to the outcome measure appeared to have no effect on the adjusted data one way or the other.

One additional approach was utilized to explore the effect of a different type of analysis on the findings. This approach involved entering the covariates into a discriminant analysis to maximize the differences between the Head Start and the comparison group. Each child's discriminant score was then used as the single covariate in the subsequent ANCOVA. Using GPA as the dependent measure, this approach resulted in adjusted average GPA's of 2.17 for the Head Start students and 2.07 for the comparison group, which was not statistically significant ($p = .65$). The adjusted averages presented in the report were 2.18 and 2.04 ($p = .53$). When the factors were included as part of the discriminant analysis, the adjusted figures were identical to those presented in Chapter 3. Again, use of a different analytical approach appeared to have no effect on the findings.

TABLE G-1

Experimental Analyses

Dependent Measure: GPA

Factors		Covariates[a]								
Sex	Ethnic	ME	In	PI	Pe	SP	MO	H. S.	Comp.	p
Unadjusted average:								2.14	2.32	
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**2.18**	**2.04**	**.53**
x		x	x	x	x	x	x	2.20	1.91	.15
	x	**x**	**x**	**x**	**x**	**x**	**x**	**2.18**	**2.06**	**.61**
		x	x	x	x	x	x	2.20	1.92	.18
x	x							2.13	2.36	.20[b]
x	x	x						2.15	2.24	.60
x	x		x					2.16	2.14	.91
x	x			x				2.15	2.08	.70
x	x				x			2.13	2.34	.26[b]
x	x					x		2.13	2.38	.16[b]
x	x						x	2.13	2.36	.20[b]
x	**x**	**x**	**x**					**2.18**	**2.03**	**.46**
x	**x**	**x**		**x**				**2.18**	**2.03**	**.51**
x	**x**	**x**		**x**		**x**	**x**	**2.18**	**2.04**	**.53**
x	**x**	**x**	**x**		**x**	**x**	**x**	**2.18**	**2.00**	**.39**

Note: First boldface line represents data presented in the report. Other boldface lines are combinations that provided similar results.

a. ME=mother's education, In=income, PI=per person income, PE=number of people in household, SP=single parent, MO=mother's occupation

b. Comparison score exceeds Head Start score.

TABLE G-1 (cont.)

Dependent Measure: Percentage scoring above 80th percentile on Gr. 5 Iowa Test

Factors		Covariates[a]								
Sex	Ethnic	ME	In	PI	Pe	SP	MO	H. S.	Comp.	p
Unadjusted proportions:								.03	.07	
x	x	x	x	x	x	x	x	**.06**	**-.05**	**.00**
x		x	x	x	x	x	x	**.06**	**-.05**	**.01**
	x	x	x	x	x	x	x	**.06**	**-.05**	**.01**
		x	x	x	x	x	x	**.06**	**-.05**	**.01**
x	x							.04	.05	.69[b]
x	x	x						.04	.02	.46
x	x		x					**.05**	**-.02**	**.06**
x	x			x				.05	-.01	.18
x	x				x			.04	.05	.79[b]
x	x					x		.04	.06	.56[b]
x	x						x	.04	.05	.66[b]
x	x	x	x					**.05**	**-.04**	**.01**
x	x	x		x		x	x	.05	-.03	.04
x	x	x	x			x	x	.06	-.05	.01
x	x	x	x		x	x	x	.06	-.05	.00

Note: First boldface line represents data presented in the report. Other boldface lines are combinations that provided similar results.

a. ME=mother's education, In=income, PI=per person income, PE=number of people in household, SP=single parent, MO=mother's occupation

b. Comparison score exceeds Head Start score.

TABLE G-1 (cont.)

Dependent Measure: Percentage retained in 1980

Factors		Covariates[a]								
Sex	Ethnic	ME	In	PI	Pe	SP	MO	H. S.	Comp.	p
Unadjusted proportions:								.23	.31	
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**.22**	**.37**	**.09**
x		**x**	**x**	**x**	**x**	**x**	**x**	**.21**	**.35**	**.10**
	x	**x**	**x**	**x**	**x**	**x**	**x**	**.22**	**.37**	**.08**
		x	**x**	**x**	**x**	**x**	**x**	**.21**	**.35**	**.09**
x	x							.23	.31	.32
x	x	x						.22	.32	.19
x	x		x					.22	.35	.13
x	**x**			**x**				**.21**	**.35**	**.06**
x	x				x			.23	.31	.28
x	x					x		.23	.31	.29
x	x						x	.24	.31	.32
x	**x**		**x**		**x**			**.22**	**.35**	**.08**
x	**x**	**x**		**x**				**.21**	**.36**	**.06**
x	**x**	**x**		**x**		**x**	**x**	**.21**	**.36**	**.05**

Note: First boldface line represents data presented in the report. Other boldface lines are combinations that provided similar results.

a. ME=mother's education, In=income, PI=per person income, PE=number of people in household, SP=single parent, MO=mother's occupation

b. Comparison score exceeds Head Start score.

TABLE G-1 (cont.)

Dependent Measure: Composite (Retained, Special Education or Low Test Scores)

Factors		Covariates[a]								
Sex	Ethnic	ME	In	PI	Pe	SP	MO	H. S.	Comp.	p
Unadjusted proportions:								.70	.70	
x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**.67**	**.99**	**.04**
x		x	x	x	x	x	x	.68	.84	.15
	x	**x**	**x**	**x**	**x**	**x**	**x**	**.67**	**.99**	**.05**
		x	x	x	x	x	x	.67	.86	.14
x	x							.70	.69	.95
x	x	x						.70	.78	.36
x	x		x					.68	.85	.15
x	x			x				.70	.76	.56
x	x				x			.70	.69	.93
x	x					x		.70	.68	.86
x	x						x	.70	.70	.96
x	**x**	**x**	**x**					**.68**	**.88**	**.05**
x	x	x		x				.69	.82	.18
x	**x**	**x**	**x**		**x**			**.68**	**.87**	**.06**
x	x	x		x		x	x	.69	.82	.19

Note: First boldface line represents data presented in the report. Other boldface lines are combinations that provided similar results.

a. ME=mother's education, In=income, PI=per person income, PE=number of people in household, SP=single parent, MO=mother's occupation

b. Comparison score exceeds Head Start score.